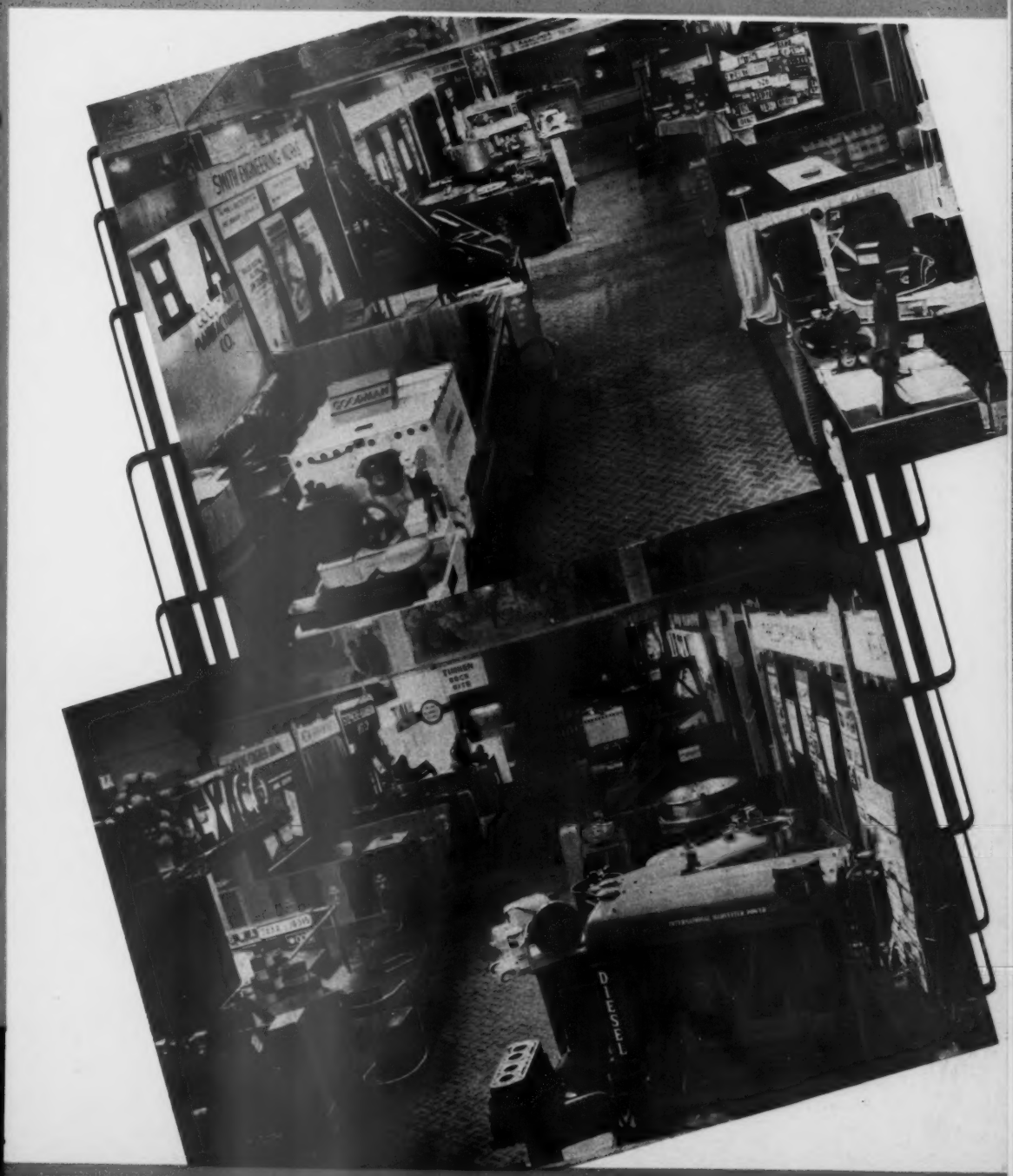
MINING CONGRESS JOURNAL

NOVEMBER, 1936



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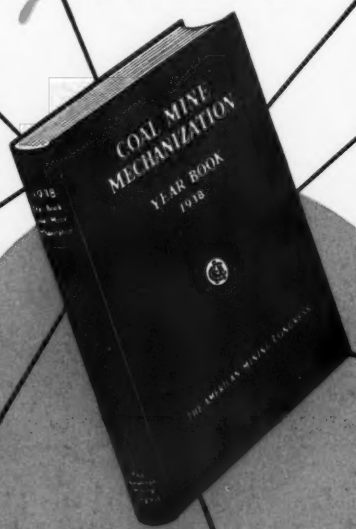

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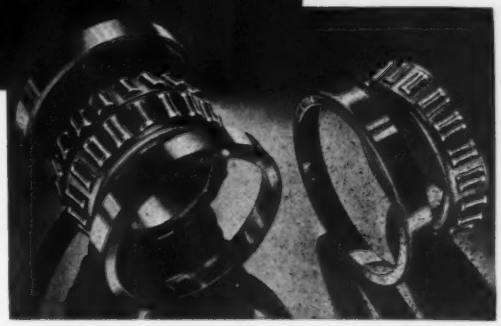

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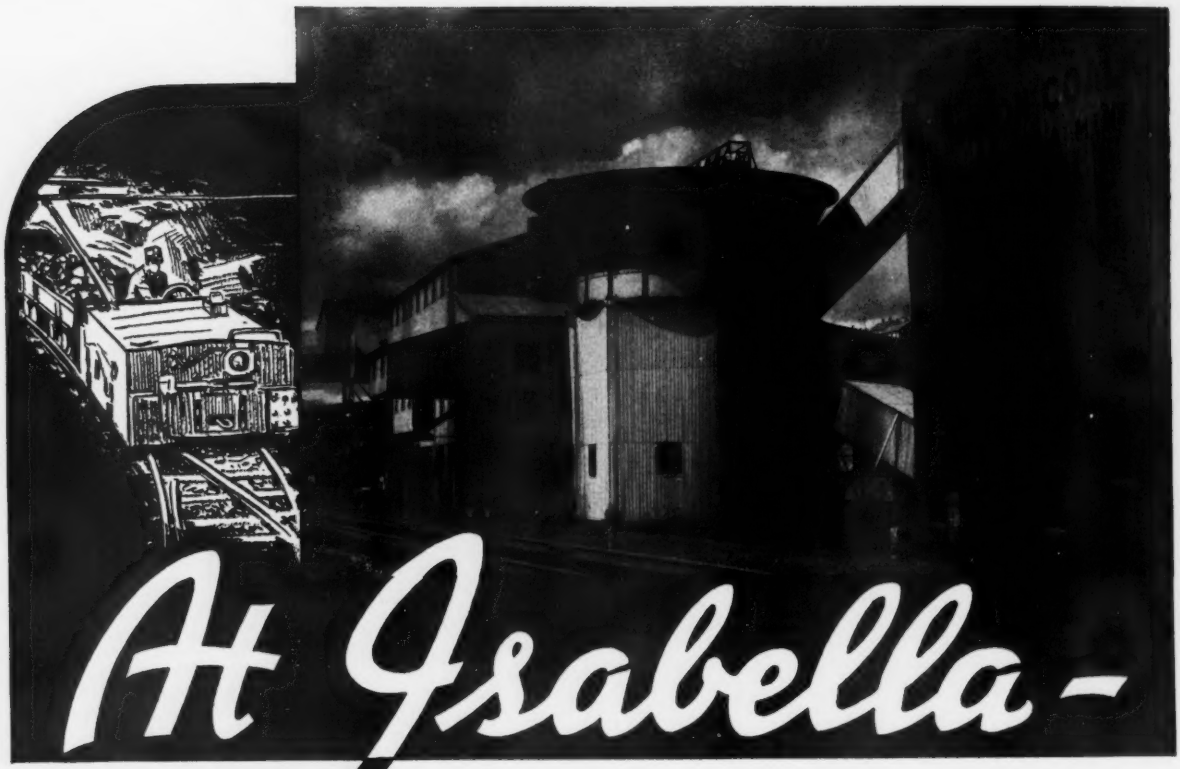

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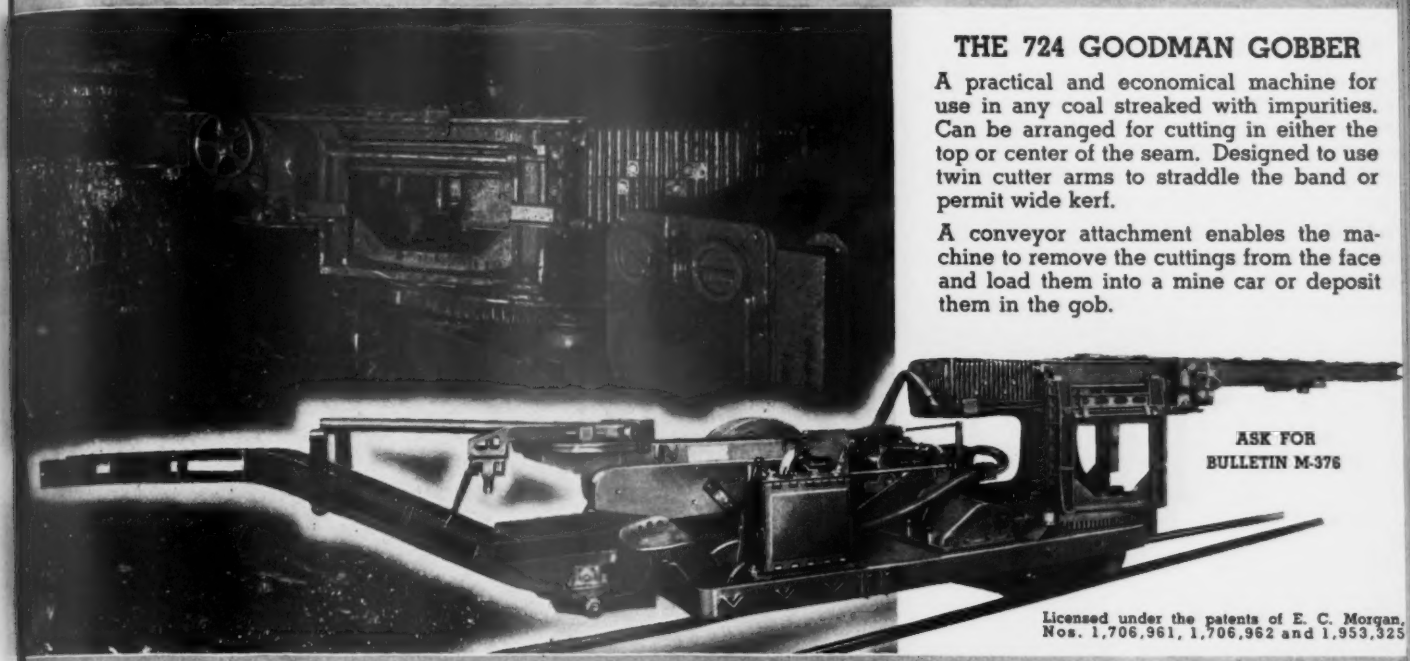

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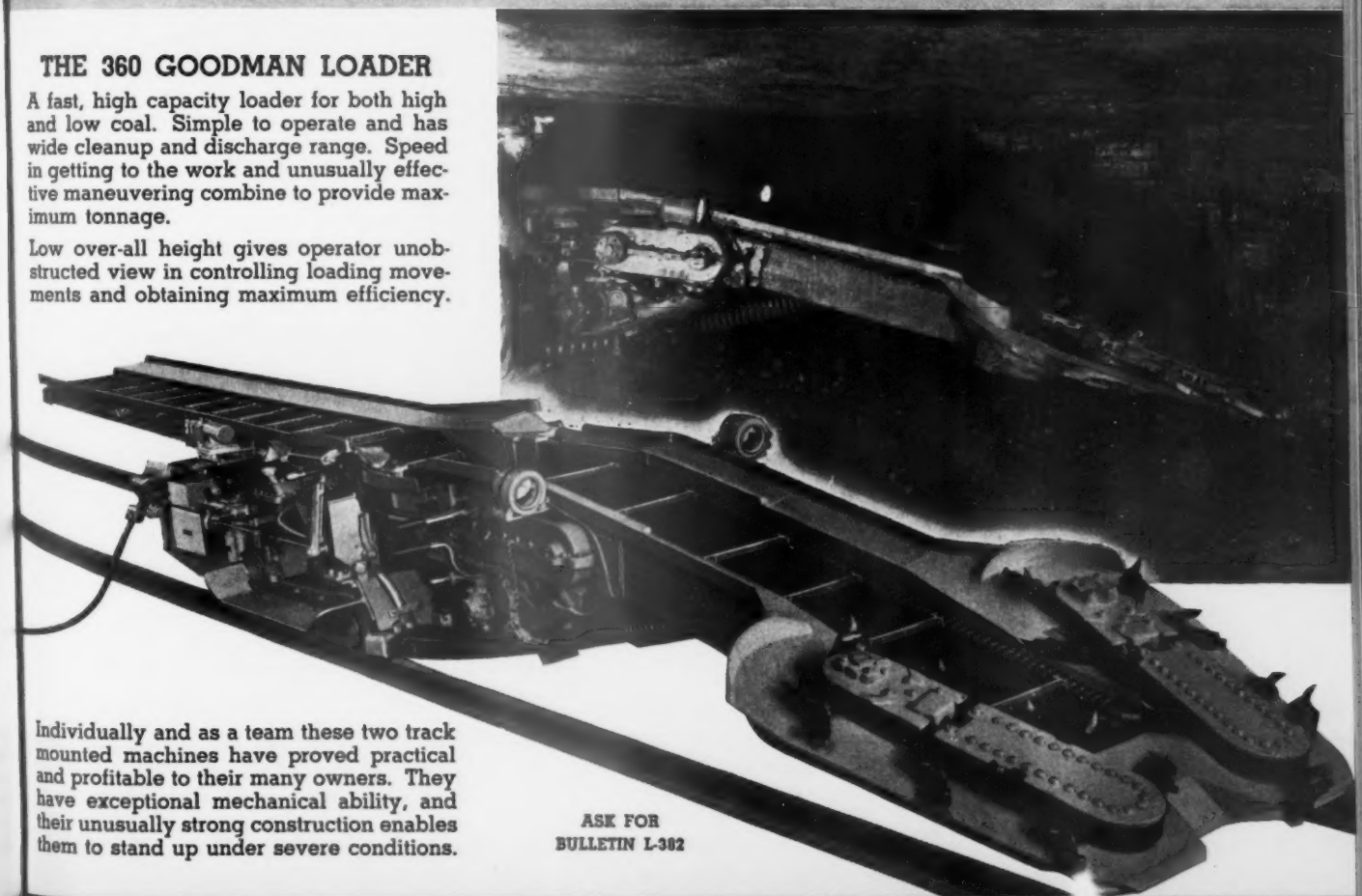

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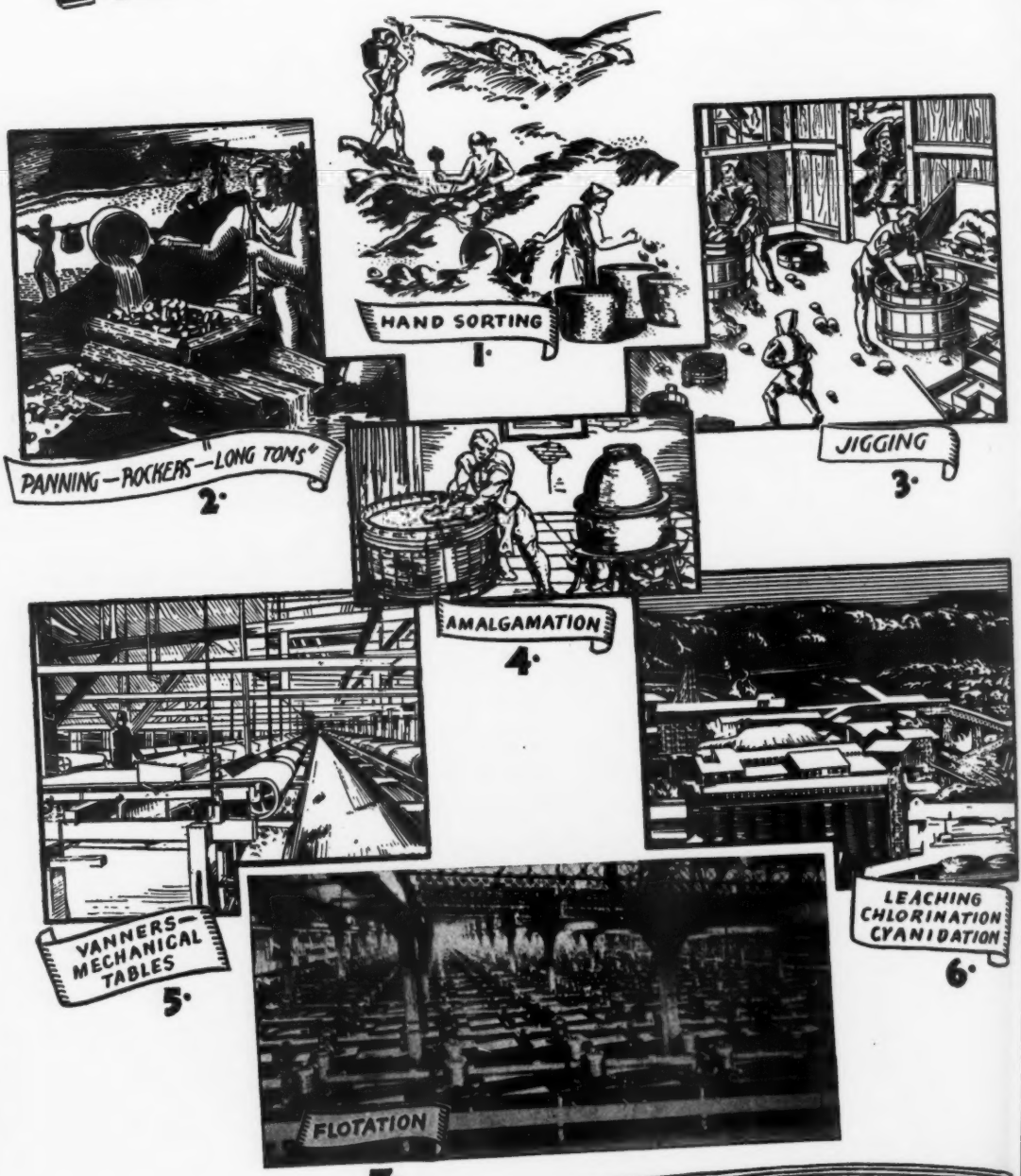

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Vol. 24 NOVEMBER, 1938 No. 11

Complete Account of the 5th Annual Metal Mining Convention and Exposition of the American Mining Congress, Western Division recently held in Los Angeles, on pages 41 to 51

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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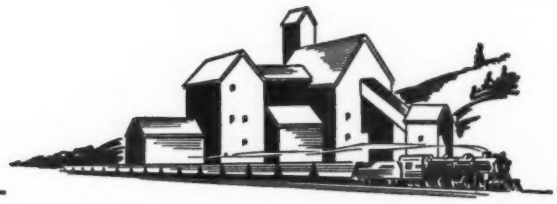


Railway Wages

THE decision of the Railway Wage Inquiry Board, appointed by the President to consider the railway wage situation, carries nothing unexpected, except perhaps the reasoning advanced to justify its conclusions.

If higher price levels are to be continued, then this report is fully justified. If, as a nation, we believe that ever increasing price levels, with no corresponding changes in import duties, will add to domestic employment, then the recommendations of the Board are fully justified.

If, on the other hand, we find large unemployment in productive enterprise; large numbers of consumers forced by high prices to economize; foreign markets made more difficult by higher priced goods; our own markets more easily accessible to importers; and that our high wages add nothing to the comforts of those so employed, because the higher costs of living fully absorb the higher wages—then it would seem time to halt long enough to consider the problem of wages and price levels with a view to the employment in more productive enterprise of the millions now on relief rolls.

Unfortunately the great majority of wage earners spend about as fast as they earn. There is no provision for the proverbial rainy day. The consequence is that hunger and want immediately threaten when the pay check is not available.

This creates a pitiful and a dangerous situation. If the present trend toward a division of national wealth shall be carried to its planned conclusion, that same pitiful condition will prevail as to all industry. Power to pass the rainy day and to recuperate from business depression will not be available, and the nation will be sadly disorganized, with danger of concomitant panic.

High costs require high price levels. High wages require high prices.

The properly paid wage earner should be able to buy the necessaries and some of the comforts of life and to save something against the day when the wage check is not available. Less than this is not a fair wage. Less than this is not his fair share of the product of his labor.

The value of that wage is determined by its purchasing power. The higher the costs of living, the more difficult it has always been for workers and for everybody. Every article of necessity must return the cost of production, the cost of transportation and the cost of distribution.

Each of these processes requires the use of both capital and labor. When both are fully employed and fairly paid, whether in money or in goods, prosperity prevails.

The costs of transportation under present conditions are an essential part in the economy of living. The report of the Railway Wage Inquiry Board means a high price level, higher wages and higher living costs, which must spread over the costs of production and distribution as well as the cost of transportation.

As a nation, we apparently have chosen the higher price level, and must, if we are able to sustain that level of costs, either increase our import duties or increase our doles to provide for increased idleness.

No greater problem faces our nation than the creation of full domestic employment and full domestic consumption of the goods so created.

High wages and low wages are relative terms and mean nothing except buying power. The conclusion of the Wage Inquiry Board means only that the high wage level endorsed must be matched by a high price level, to which all industry must adjust itself.

A JOURNAL FOR THE ENTIRE MINING INDUSTRY—PUBLISHED BY THE AMERICAN MINING CONGRESS

MINING CONGRESS JOURNAL

Vol. 24 NOVEMBER, 1938 No. 11

Richard J. Lund, Editor

CLARIFYING THE POLLUTION PROBLEM

A MOST illuminating report concerning the effect of placer mining on fish has recently come from the authoritative pen of Dr. Henry Baldwin Ward, consultant for the Oregon State Department of Geology and Mineral Industries.

Analyzing scientifically and impartially the moot question of how far and in what way the fish of the Rogue River (Oregon) and its tributaries are affected by the placer mine runoff, the author concludes that:

"All the evidence that has been obtained justifies the conclusion that no present day contributions of materials produced by bank erosion [dredging, sluicing and hydraulicking] differ in character or exceed in amount those added periodically by purely natural processes in past times. Splendid runs of salmon and steelhead were established and maintained under truly natural conditions which certainly were on occasion more extreme and violent before man ever came into the picture than they are today."

Concluding this point one may very well pause and compare the erosive power of numerous sluices and hydraulic nozzles with the tremendous volume of water coming from heavy protracted rains or melting snows. True, the placer operations direct their power in concentrated manner against unprotected banks—but stream erosion under flood conditions certainly grants no favors. Similarly, numberless mountain streams discharging from glacier sources from California to Alaska carry heavy burdens of rock flour from glacial erosion during protracted periods every year, and this has not interfered with abundant fish life.

The report goes on to compare in detail the volume and character of suspended materials in the stream water arising from natural erosion and from placer operations, stating in summary:

"To designate placer mine run-off as pollution is a confusion of terms. Neither in dictionary definition nor in scientific analysis can the use of this term be justified. . . . The placer mine run-off is composed of good water and normal unaltered soil; it carries no materials that can rightly be called deleterious substances. This distinction is fundamental and should be emphasized."

Going one step farther, the author points out that solids in suspension in the streams as a result of placer mine run-off may actually be advantageous to fish life in two respects: (1) The protection from the angler's lures afforded by water turbidity, and (2) a possible increase in the food supply brought about by collection of colloidal organic foods on tiny particles of inorganic material in suspension, the latter not damaging in any way the gills or digestive system of even the young fish at the most susceptible period of their life.

With the probability of stream pollution again coming up for Congressional consideration in the near future, it is more than likely that Dr. Ward's report will prove of considerable value to the mining industry in presenting the facts on the situation in their true light.

COAL PRICES AND COMPETITIVE FUELS

WITH the conclusion of the western and eastern price hearings of the National Bituminous Coal Commission, the machinery of establishing and promulgating minimum prices for coal is moving into the home stretch.

No one knows better than the Commissioners the magnitude and arduousness of their task, and they are to be commended for the painstaking effort expended in their attempt to effectuate the letter of the law in the Coal Act of 1937. Presumably it has been necessary to "make haste slowly" in this work, but the effect of the delay and incertitude concerning prices, involving necessity of inserting cancellation clauses in contracts, has been far from beneficial to the industry. Meanwhile, it is probably safe to assume that competitive fuels have been making the most of the situation, and that the net effect may well have been loss of further markets during this "transition period."

The crucial test, however, will be decided after prices are fixed. Then, and only then, will it be possible to answer the question of whether by raising prices the industry as a whole has been benefited, or whether the true solution of the industry's ills lies in cheaper production through modernized methods permitting sale of a better product at lower prices and thus regaining markets lost to competitive fuels.

The CALYX CORE DRILL

● ***Used Effectively in Sinking Six Ventilation Shafts at Anaconda's Mountain Con Mine During Past 2 Years***

By MICHAEL P. TIERNEY
Research Department
Anaconda Copper Mining Company

Fig. 1. Looking down into one of the 36" Calyx-bored shafts

ALL core drilling was done with the use of black diamonds until approximately fifty years ago, at which time the cost was so excessive that another method of core drilling, called "Calyx," was introduced. This method used chilled steel shot which when fragmented gave a cutting action under a rotating bit. The rolling action of the round shot under the bit and the abrasion of the fragmented shot are responsible for the cutting action of the bit.

The Calyx drill, sometimes called a shot drill, is used for drilling holes from 4 in. up to 6 ft. in diameter, and has been used in test drilling of proposed damsites, the drilling of grouted damsites to check the effectiveness of the grouting, the test drilling of concrete highways and structures as large as dam foundations, prospecting of mineral deposits, the drilling of holes in slate quarries for the installation of wire saws, and many other drilling operations where it has been adaptable.

Fig. 2. Calyx drill station showing sinking bucket, utility hoist and drill head on 3800 level

Drill Apparatus Described

The large Calyx drills have been available for several years for surface and underground work. The first hole to be drilled underground was at the Mountain Con Mine of the Anaconda Copper Mining Company, Butte, Mont. The Calyx drill used is powered by a 30-hp. electric motor, and drills a 36-in. hole. (See Fig. 1). The details of the machine are shown in Fig. 2.

The drill bit consists of a cylindrical cutting shoe which is welded to a core barrel. The bit has a top plate welded to the inside of the core barrel. A bottom plate is located about 1 inch below the top plate, as shown in Fig. 3, which distributes the drill shot to the inside periphery of the core barrel face of the bit. The shot drops down between the inside of the cutting section and the periphery of the core being cut. When the shot reaches the bottom of the cut it works its way under the bit, and the weight of the bit crushes it into sharp fragments. The rotation of the bit upon the fragmented shot and the rolling action of the unbroken shot cuts the rock. The bit is driven at 100 r.p.m through a speed reduction gear assembly.

Water for drilling follows the same course as the shot. From the bottom of the cutting section the water ascends along the outside of the bit, carrying the cuttings and depositing them in the top or "Calyx" of the bit.

The Calyx Station

Before starting a Calyx hole, a station must be cut and timbered to set up and operate the drill. Fig. 4 shows the dimensions of the ground excavation and the timbering for the standard Calyx drill station. Twenty-five feet for headroom is allowed over the hole for pulling the string of tools. The Calyx machine proper occupies two sill sets. The remaining portion of the station is used for storing equipment and supplies. Fig. 5 shows the

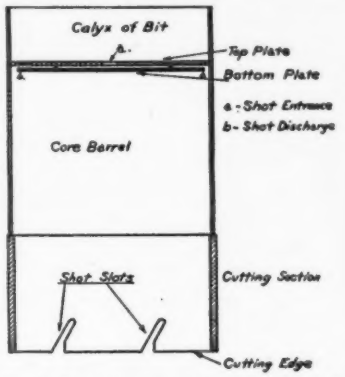


Fig. 3. Diagrammatic sketch of Calyx drill bit

Calyx bit emerging from the hole and later hung for storage in the first set above the sill, with the drill rods along side. Small mucking tools used in sinking are shown hung on the station timber in Fig. 6.

Calyx Drilling as Aid to Ventilation

Development on lower levels in the Butte district is usually a serious ventilation problem because the larger mines have shafts sunk as deep as 4,000 ft., and the rock temperatures encountered are high.

The old method of attacking the ventilation problem on the bottom levels consisted of blowing the air by means of fans from the two downcast compartments of the shaft to the working faces (Fig. 7). The warm air was then returned through the drifts and cross-cuts to the two upcast compartments of the shaft. The difficulty with this system was in keeping an air-tight seal between the two air courses, to avoid intermixing of the hot and cold air. Also the hot water flowing in the shaft column

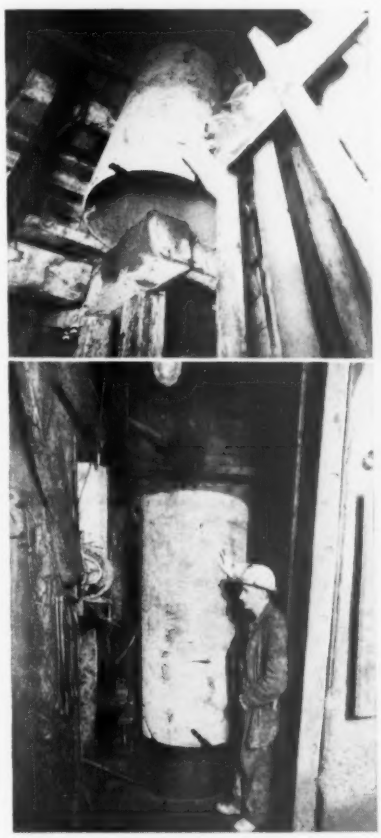
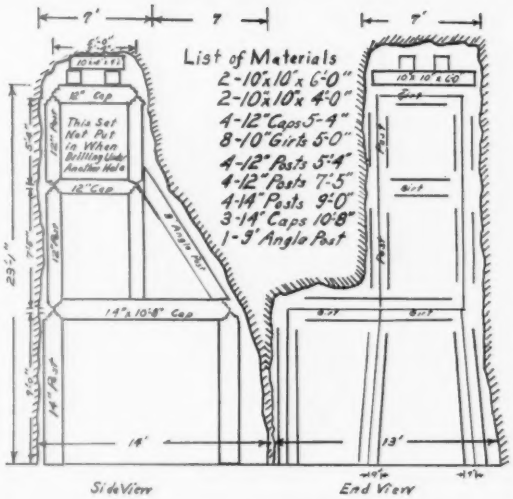


Fig. 5. Top: Looking up to anchor sheave, showing method of storing bit and rods when not drilling. Bottom: 6' x 36" Calyx bit suspended over drill hole



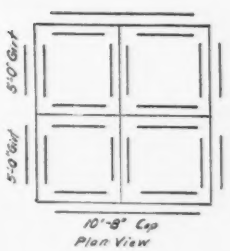


Fig. 4. Standard station for Calyx drill. All timber is standard rocker frame, and standard lengths

pipe has at times caused complete reversals of the air courses resulting in bad working conditions.

On the bottom levels of the Mountain Con Mine the vein is approximately a thousand feet from the shaft. This condition made ventilation to the working faces very difficult until such time as the first raise to the level above had been holed. Under the hot working conditions men were unable to do a full shift's work.

In order to keep men working and to push development, expensive fan installations had to be made. Much money was spent on air-tight shaft lining and fan tubing, and high prices had to be paid the contract miners. All of these items added to the high cost of bottom level development.

In 1935 it was decided to try drilling ventilation holes with a Calyx drill. The following method of developing a bottom level was adopted at the Mountain Con Mine. The method is best described by referring to Fig. 8, a longitudinal section through a bottom level showing the completed Calyx hole and the bottom level cross-cut about to intersect it.

After drilling Hole No. 1 a slight improvement in the plan was made, and Hole No. 2 was placed near the shaft as shown in Fig. 9. The placing of the hole, as seen from the sketch, made possible much better working conditions for the men driving the initial cross-cut, because a positive flow of good air could be maintained throughout the entire cross-cut driving period. The new ventilation plan was first tried when developing the 3,900-ft. level.

At approximately the same time that the first Calyx holes were being drilled, the first air cooling and conditioning plant was installed at the mine. The first hole made an excellent air course for return air from the 3,800-ft. level to the 3,600-ft. level. From the 3,600-ft. level the air passed through a raise to the 3,500-ft. level, where the first cooler was installed.* This first hole and the air conditioning plant improved working conditions

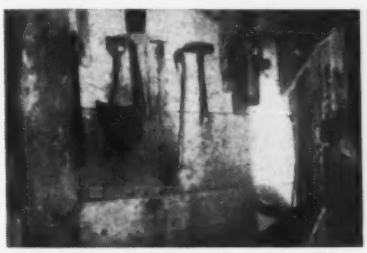


Fig. 6. Small mucking tools used in sinking. Bale explained in Fig. 10 is at right, with electric blasting reel just above it

considerably. However, the third and fourth holes, which were completed at approximately the same time as the second plant on the 3,600-ft. level, made even a greater improvement.

The following temperatures were taken within two weeks of each other, except where noted, and show exactly how the whole mine was affected by the completion of the air conditioning plant and the Calyx holes.

It is understood that the Calyx holes have no direct cooling effect themselves, as their only function is to conduct away the hot air from the working face and prevent the intermixing of the hot used air with the cool unused air from the shaft.

The improved working conditions are of course immediately reflected in

* See Richardson, A. S., Air Conditioning for the Ventilation of Butte Mines, "Engineering and Mining Journal," Vol. 139, No. 10, Oct. 1938.

TEMPERATURES BEFORE AND AFTER OPERATION OF AIR CONDITIONING PLANT NO. 2 AND HOLING OF CALYX HOLES

	Avg. Dry Bulb Temp. Degrees F.	Avg. Wet Bulb Temp. Degrees F.
Breast on Bottom Level—		
Before	94	92
After	62	62
Temperature drop	32	30
Average Temperature of 14 Working Places on Lower Levels—		
Before	90.4	88.2
After	76.9	74.4
Temperature drop	13.5	13.8
All Mine Working Places—		
Before, Sept., 1937	87.1	83.7
After, Feb., 1938	78.7	75.3
Temperature drop	8.4	8.4

the cost of mining and in the speed with which the work can be carried forward.

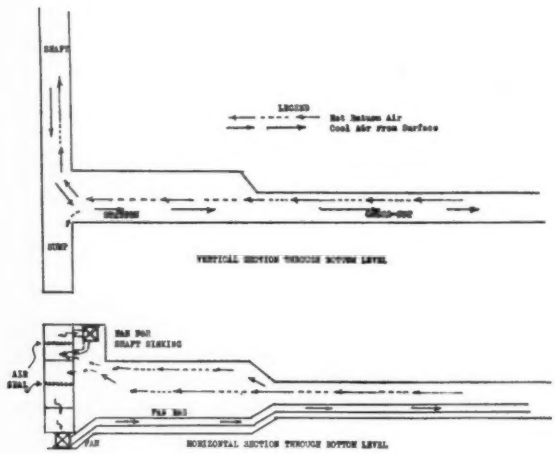


Fig. 7. Sketch of old method of bottom level ventilation

Type of Ground Drilled

When the first large diameter Calyx hole was drilled in Butte, very little was known as to the "drillability" of different kinds of ground. We have since found that a hard solid granite will drill much better than soft decomposed granite or any rock which has small stringers of vein material running through it. Such rock will almost invariably break along the stringer. When a piece of the core or wall breaks off, drilling must be stopped, the string of tools pulled, the water pumped out and the piece of rock removed. We have also found that it is impracticable to drill in the ore itself.

In the Butte mines practically all of the country rock is interspersed with small stringers of pyrite and crisscrossed with faults and fracture planes. For this reason, with the exception of Holes Nos. 2 and 6, approximately 75 per cent of the core had to be mucked by hand and hoisted in buckets. It was necessary to handle an excessive amount of hot acidic ground water, and approximately one-half of the total wall area of the holes had to be cemented.

Discussion of Drilling Operations

The Calyx hole drilling cycle is very regular. If we arbitrarily set the drilling operation as No. 1, the progress of operations in their proper order would be as follows:

No. 1. Drilling.

No. 2. Pulling string of tools and bit.

(a) Hoisting string of tools with 15-hp. hoist by disconnecting each 10- or 20-ft. length of rods as they are hoisted to the collar. (Special hoist bail shown and described in Fig. 10).

(b) Removing bit and hanging it on bit hanger in station (Fig. 5).

No. 3. Pumping drilling water and inflow of ground water from hole.

(a) Lowering pump and hoses with 15-hp. hoist into hole.

(b) Pumping water from hole.

(c) Removing hoses and pump from hole and either laying hose along the adjoining crosscut or reeling it on hose reel.

No. 4. Pulling core or mucking out hole.

(a) Lowering man into hole with small hoist on boatswain's chair.

(b) Digging out drill cuttings from cut and inserting half

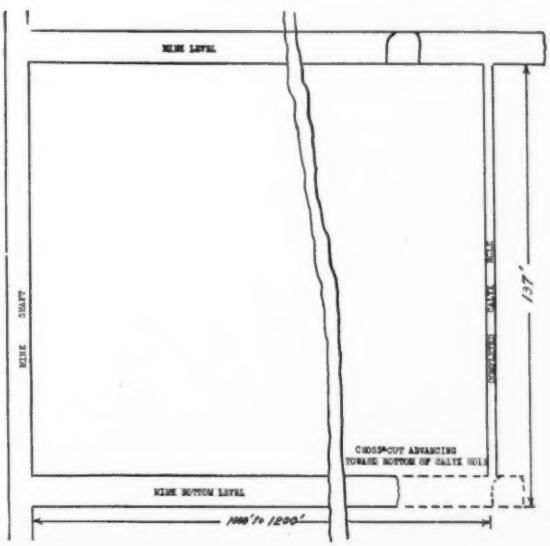


Fig. 8. Longitudinal section through a bottom level showing new method of development

stick of powder with electric primer in cut (See Fig. 11).

(c) Hoisting man from hole and shearing off core by blasting.

(d) Lowering man and jackhammer into hole, drilling a 6-in. to 12-in. hole in core, inserting a wedge eye bolt, attaching the cable from the 15-hp. hoist to core and hoisting to top of hole.

(e) Lowering man into hole and mucking out broken pieces.

(f) Sprinkling one to two pounds of shot in remaining part of cut, and resuming cycle.

The above stated operations will vary slightly in their sequence, depending on the condition of the ground. When bad drilling ground is encountered and the wall sloughs off, cementing is necessary. In such an instance the cementing is done after the operation of mucking. Bad ground, in addition to requiring the extra work of cementing, also increases the amount of work required to remove the core, as it is usually badly broken and can not be pulled in one piece. (Fig. 12). When this condition exists, it is also necessary to keep the pump operating in the bottom of the hole, sometimes continuously, while the mucking operation is carried on.

The cementing is done in the following manner:

(a) The side of the hole is picked down, and 80-penny spikes are driven into the cracks in the wall. They are allowed to protrude 3 in. to 4 in. from the face. This is done in order that the cement will have a better chance to grip the wall.

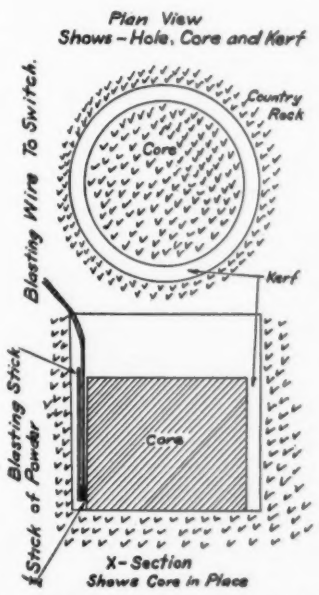


Fig. 11. Sketch of hole with core in place. Shows how solid core is broken loose

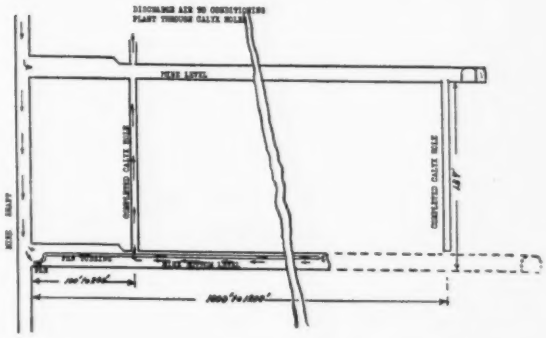


Fig. 9. More advanced stage of bottom level development by new method. Arrows indicate course of air

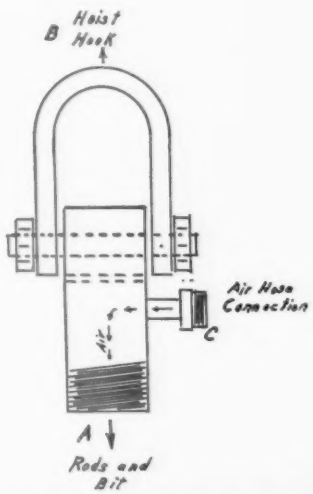


Fig. 10. Hoisting bale with air hose connection, used to dislodge bit from bottom of hole when hoist cannot move it. Bale is attached to rods at A, air hose at C, and hoist hook at B. When air is turned into the bit it will rise to level of water in hole—having same action as pneumatic or hydraulic jack

(b) The collapsible cementing ring is lowered and tightened in place, or the alternate method is chosen, whereby quarter circle segment forms are used in place of the ring. The choice of the method used depends on the amount of cementing to be done and the condition of the wall.

(c) The cement is mixed, lowered in a 2-cu. ft. bucket, and poured behind the cementing form.

(d) The cement is allowed to stand until partially set, when the forms are removed.

(e) All high spots on the cement are brushed off with a wire brush.

After the cementing operation it was usually necessary to clean out about a bucket full of cement which had been spilled in the bottom.

Drilling

There were many interesting problems encountered in connection with the various operations, which in turn were different for each hole. The technique of drilling, itself, was something that the men had to work out by trial and error. The men first had to familiarize themselves with the sound or "feel" of the machine to know when it was drilling properly, and later they learned how the rate of feed of the shot, water and bit should be controlled for various kinds of ground.

Two different sizes of drill shot were used—the large size of from ⅛ in. to 1/16 in. in diameter and the small size of 1/16 in. in diameter and under. When hard firm ground is being drilled the small size shot is used, while the large size gives better results in soft ground. The reason for this peculiarity of the different size shot is not definitely known; however, it is thought that the smaller shot becomes imbedded in the softer decomposed minerals of the rock, and consequently hinders the cutting action of the bit and shot. Under good drilling conditions and in hard ground, the drilling speed will average from 10 in. to 12 in. per hour.

The original Calyx bit was the same as the present standard Calyx bit, with the exception that the core barrel and the cutting section had the same inside and outside dimensions. While drilling Hole No. 1, a great deal of trouble was caused by the core breaking and wedging against the side of the bit. This trouble also resulted in much extra work, because many times the core broke after drilling only 2 in. or 3 in. When this happened it was necessary to pull the entire string of tools,

Fig. 12. Left: Broken core from unfirm ground. Below: Solid core from firm ground

pump out the water and go down into the hole to muck out the few inches of core. The cause of the core breakage was thought to be the grinding action of the shot as it passed down the side of the core barrel. The thickness of the core barrel was therefore decreased so that more clearance was made for the shot to pass between the core and the core barrel. The slight change in the design of the bit improved it considerably, and is now incorporated in the construction of the standard Calyx bit.

As seen from the sketches of the standard Calyx bit, the passage of the drill shot to the cutting edge of the bit was left largely to chance, and much of the shot never reached the cutting edge. The thought that much of the shot was being wasted was confirmed by the finding of drill shot on top of the core after the period of drilling. The shot thus scattered on the core could not be economically recovered, and was therefore wasted.

Double Wall Bit Effective

In order to attempt to reduce shot consumption and also to try to further reduce core breakage, the double wall bit was designed. The first bit was made by remodeling an old standard Calyx bit. It was used for drilling part of Hole No. 3 and part of Hole No. 4. In each case the double wall bit was used alternately with a standard bit.

The record of the amount of Calyx shot used on the holes shows that the double wall bit made a saving. Hole No. 2, where drilling conditions were much better, was the only other hole which was as low in shot consumption.

	Pounds Shot Used	*Feet Drilled*	*Pounds Per. Ft. Drilled*
Hole No. 1	2,000	81	24.7
Hole No. 2	1,400	120	11.7
Hole No. 3	1,100	99	11.1
Hole No. 4	1,300	105	12.4
Hole No. 5	1,800	114	15.7
Hole No. 6	2,900	119	24.4

The greatest advantage shown by the double wall bit was on Hole No. 3. It was found that the standard bit averaged roughly 1 ft. of drilling without pulling the bit and mucking out, while the double wall bit averaged 2 ft. and drilled as much as 3 ft.

For both Holes Nos. 3 and 4, the variations in the ground and drilling conditions prohibited an accurate comparative test between the two type bits; however, the principle of the bit proved to be sound, and it was decided to make a new complete bit for use on future holes.

The Anaconda Type Double Wall Bit is now complete (Fig. 13), and will be used alternately with a standard case hardened bit on the next hole drilled. The use of the two type bits on alternate drilling shifts is expected to give a good comparative test.

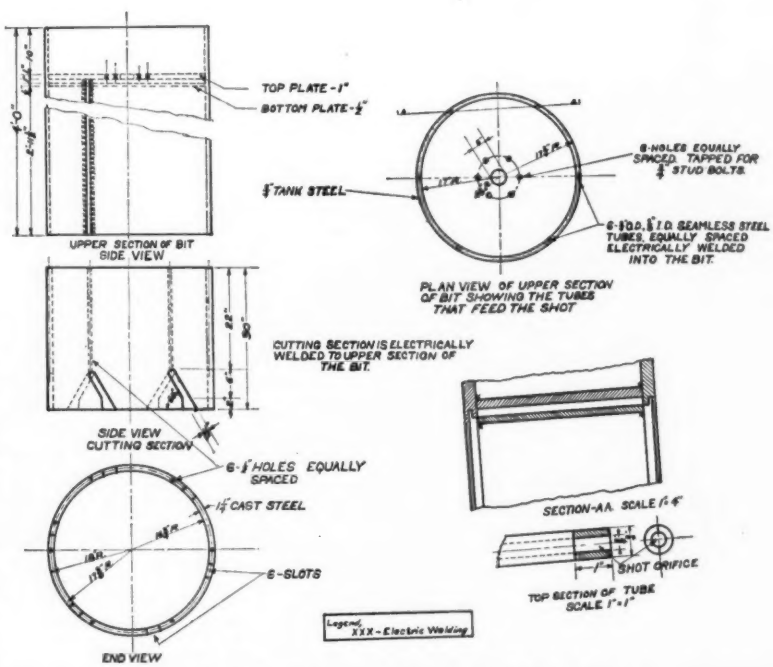

TOP PLATE - 1"
BOTTOM PLATE - ½"
½" TANK STEEL
UPPER SECTION OF BIT SIDE VIEW
6-HOLES EQUALLY SPACED, TAPPED FOR ¾" STUD BOLTS
6-3" O.D. ½" I.D. SEAMLESS STEEL TUBES, EQUALLY SPACED ELECTRICALLY WELDED INTO THE BIT.
PLAN VIEW OF UPPER SECTION OF BIT SHOWING THE TUBES THAT FEED THE SHOT
CUTTING SECTION IS ELECTRICALLY WELDED TO UPPER SECTION OF THE BIT.
SIDE VIEW CUTTING SECTION
6-¾" HOLES EQUALLY SPACED
1¼" CAST STEEL
6-SLOTS
END VIEW
SECTION-AA. SCALE 1"=4"
SHOT ORIFICE
TOP SECTION OF TUBE SCALE 1"=1"
Legend XXX - Electric Welding

Fig. 13. Details of Anaconda Type Double Wall Calyx bit

The upper section of the bit is made from rolled mild steel, and the cutting section is cast mild steel. All previous bits were made entirely from rolled mild steel, but experimenting will be done with different cast steels and also case hardened steel in an effort to decrease the wear on the cutting section. The standard Calyx bit which will drill alternately with the double wall bit will have a case hardened, rolled, mild steel cutting section.

Pumping

The problem of dewatering the hole gave much trouble on the first and third holes. The ground was badly fractured, and the flow of water into the hole through the fractures necessitated continual pumping while mucking.

Because of the small area in which the men have to work, both in the hole and at times in the Calyx station itself, the problem of handling the long lengths of hoses on the pump has been difficult. This problem was partially solved by the use of a hose reel, on which the discharge and air hoses are wound. After reeling, the pumping equipment can be easily moved out of the way. When dewatering is again necessary, it is moved back to the hole.

Hole No. 3 was the hardest hole to dewater that we have yet encountered. At a depth of 80 ft. the hole was making approximately 25 gallons of water per minute. At that time we were using two pumps, mounted in tandem. After pumping for only a few hours, the impellers would be worn badly or the bearings would be entirely worn out. The excessive impeller wear was caused by the abrasive gravel in the water, and the high temperatures made adequate lubrication of the bearings difficult.

A different type pump is now used. It is of the enclosed impeller type and a more sturdy over-all construction. One of the new type pumps now does the work which required two of the old type. In addition to the better performance of the new type pump, it also requires only about half the space of the two tandem mounted pumps. This is a great advantage when it is necessary to pump while mucking.

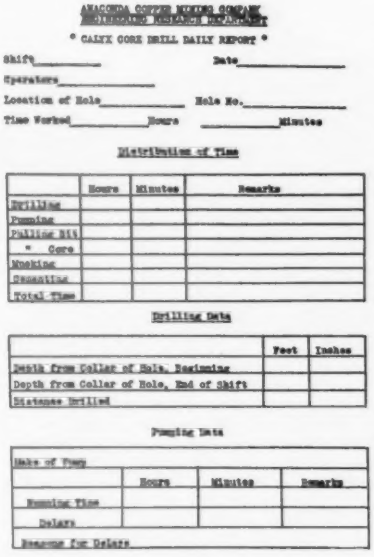
Cementing

Cementing on Hole No. 1 was done by first placing a cylinder 30 in. in diameter by 4 ft. high in the bottom of the hole, and pouring the cement around the outside. After the cement had set, the bit was lowered and the excess cement around the ring was drilled out.

This method of cementing necessitated many operations which were later eliminated by use of a collapsible cementing ring.

When using the ring it is lowered into the hole and tightened firmly against the circular part of the wall. The cement is then poured in behind it, filling the holes. Before the cement has set hard, the ring is collapsed and hoisted from the hole. A man then brushes off any high spots with a wire brush to make sure that the bit will pass.

The present method of cementing eliminated the operation of drilling out the ring, decreased the amount of cement used and obviated the operation of mucking out after cementing.



* CALYX CORE DRILL DAILY REPORT *

Shift_____ Date_____

Operators_____

Location of Hole_____ Hole No._____

Time Worked_____Hours _____Minutes

Distribution of Time

	Hours	Minutes	Remarks
Drilling			
Pumping			
Pulling Bit			
" Core			
Mucking			
Cementing			
Total Time			

Drilling Data

	Feet	Inches
Depth from Collar of Hole, Beginning		
Depth from Collar of Hole, End of Shift		
Distance Drilled		

Pumping Data

Make of Pump

	Hours	Minutes	Remarks
Running Time			
Delays			
Reasons for Delays			

Fig. 14. Daily report sheet filled out by operator on each shift

Time Studies Described

Hole No. 5 may be considered an average hole. It has therefore been selected to give the reader a general conception of where and how the time is spent in drilling. Fig. 14 is a daily report sheet which the operator on each shift filled out.

The daily distribution of labor was recorded on sheets similar to Fig. 15, which shows the date, the number of feet drilled on that date and the distribution of the total number of man-hours to each operation. The total number of man-hours was divided among eight operations. These eight operations covered the different types of labor necessary for the sinking of the Calyx drill hole. The drilling time was the actual running time of the drill. The pulling bit time comprised the time required to lower the bit and rods, as well as the time spent removing the solid pieces of core. The mucking time included the number of hours spent in removing the broken pieces of core and fine muck from the hole. The cementing time was spent in cementing the walls of the hole where they would not stand without support. The miscellaneous time was devoted to doing odd jobs about the drill, such as making minor adjustments on the equipment. The delays comprised the time lost due to lack of compressed air or to breakdown of the equipment. The pumping time included the time necessary to lower and raise the pump, as well as the time consumed in pumping the water.

The distributed man-hours were

DAILY LABOR DISTRIBUTION FOR CALYX DRILL HOLE No. 5

			MAN HOURS							
Date	Dist'ce Drilled	Drilling	Pulling Bit	Pulling Core	Muck-ing	Cement-ing	Misc.	Delays	Pump-ing	Total
2/2/38	3' 8"	7.00	4.00	0.00	8.00	0.00	10.00	0.00	3.00	32.00
3	1' 4"	9.00	8.00	0.00	8.00	0.00	3.00	0.00	4.00	32.00
Total	10' 0"	32.00	29.50	0.00	34.50	0.00	37.00	0.00	20.00	153.00
Grand Total	100' 0"	256.50	142.00	25.00	289.00	83.00	122.00	26.00	96.00	1039.50
2/4/38	4' 0"	10.00	8.00	0.00	8.00	0.00	0.00	1.00	5.00	32.00
5	3' 5"	8.00	8.00	0.00	10.00	0.00	0.00	0.00	6.00	32.00
7	2' 1"	8.00	8.00	0.00	10.00	0.00	0.00	0.00	6.00	32.00
8	3' 5"	10.00	6.00	0.00	3.50	0.00	0.00	0.00	4.50	24.00
-	0.00	0.00	0.00	0.00	0.00	48.00	0.00	0.00	0.00	48.00
Total	12' 11"	36.00	30.00	0.00	31.50	48.00	0.00	1.00	31.50	168.00
Grand Total	113' 0"	292.50	172.00	25.00	320.50	131.00	122.00	27.00	117.50	1207.50

Fig. 15. Sheet showing daily distribution of labor

totaled after each 10 ft. of drilling, and then were added to the total number of man-hours that had been spent on each operation.

Fig. 16 is the distribution of labor sheet for the entire depth of the hole. This sheet shows for each individual operation the time in man-hours and in percent for each interval of sinking. The total number of man-hours, total number of man-shifts, and the total number of man-shifts per foot of hole are also shown.

The curves plotted on Fig. 17 show in percent the distribution of labor required for the sinking of the hole. The individual percent curve shows the percentage of the total time required for each operation. The cumulative percent curve represents the total time required for the total depth of the hole. From the cumulative percent curve one can immediately determine the total percentage of time that was required for one or more of the operations.

The curves on Fig. 18 represent the average percentages of the total time devoted to each of the eight operations as the depth of the hole progressed.

Data such as these were kept on each individual hole, and proved very valuable for determining where excessive time was being spent and pointed out where improvements in equipment and in drilling practice should be made.

Conclusion

Six holes have been drilled to date at the Mountain Con Mine between the 137-ft. lifts. Fig. 19 shows how the Calyx holes are handling the major part of the exhaust air from the bottom levels. Each hole is equipped with a high-pressure fan and, under normal operating conditions, handles approximately 20,000 cu. ft. of air per minute.

There is no means of determining all the money which has been saved by the improvement of working conditions and the resultant overall efficiency of the mine. However, direct calculations based on contract prices alone, before and after the Calyx holes, show that the holes have proved a good investment.

Fig. 16. Distribution of labor in drilling Calyx drill hole No. 5—started Dec. 28, 1937, and finished Feb. 8, 1938. Total depth from collar 114 feet

Future of Calyx Hole Drilling

The first Calyx hole in Butte was drilled approximately two years ago. The average length of time the other holes have been standing is more than a year. There has been no sloughing of the walls, and the holes appear to be in as good condition as they were when completed.

Probably the best way to convey to the reader the strength of the circular section of a Calyx hole is first to describe the type of ground through which the holes were drilled and to state how the same ground would be handled if driving a drift or cross-cut. In such a case the ground of Hole No. 1 would be considered "heavy or sloughing." It would require close timbering to the breast and possibly head-boards over the men while drilling a round. Hole No. 3 ground would require the same treatment. The ground of the other holes was better, and in a drift or cross-cut would require occasional timber—that is, it would be necessary to spot one or two sets or a stull and head-board wherever required. This point of the type of the ground in which the holes were drilled is emphasized to show the comparative strength of the round drilled section over that of the rough blasted section of a drift or cross-cut.

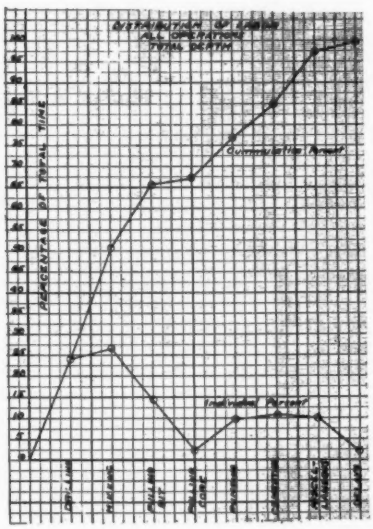


Fig. 17. Distribution of labor, in percent, required in sinking Hole No. 5

The strength of the completed Calyx hole to resist ground movement and sloughing therefore opens a great new field in mining to the large diameter core drill. We have not as yet used the Calyx hole for anything other than ventilation. However, the core drill has been used for shaft sinking in various parts of the country.* There is a possibility that it could also be used for such work in Butte, but its greatest possibility is for use as a transfer raise between levels. For such a use a hole larger than 3 ft. would probably be better, as there might be a tendency for the muck to arch and 'hang-up" in a hole as small as 3 ft.

Another possible use for the Calyx hole is a place for the installation of pipe lines and electric cables. Such an installation would remove them from the shaft and away from the danger of being damaged by falling rock. This is an important factor, especially for electric cables where such damage may cause fire. Also the maintenance for the electric cables would be decreased by such an installation. Diamond drill holes have been used for this work and have proved satisfactory except in one instance where excessive ground movement occurred. It would not be advisable to use a large Calyx hole for only a small electric cable, but where it is necessary to have room for many cables and large pipes, such as are required for the installation of one of our conditioning plants, a large hole might prove very practical.

* See Richards, B. S., Sinking a Ventilation Bore Hole in Minnesota, "Mining Congress Journal," October, 1938, p. 28.

There is still another possible use for the large holes in the Butte Mines where there are many shafts as close together as 500 ft. In such cases where one of the shafts is deeper than the other, and it is desired to sink the upper shaft, the work could be done by first drilling a Calyx hole. At the time the drilling was being done, a cross-cut could be driven from the lower shaft to intersect the bottom of the Calyx hole. When the hole and cross-cut had been completed, the hole could then be enlarged to the size of the shaft. Such a method of shaft sinking would eliminate the costly operation of mucking on the shaft bottom as the muck could be drawn off through the Calyx hole. The shaft sinking operation could be serviced from the deeper shaft where the facilities for handling the muck and materials would be better. The operation would be safer, since there would be no hoisting between the shaft crew and the bulkhead. The cost of breaking ground for enlargement would be much less than for a regular standard shaft sinking operation, and the problem of ventilating the bottom levels of both mines would be simplified.

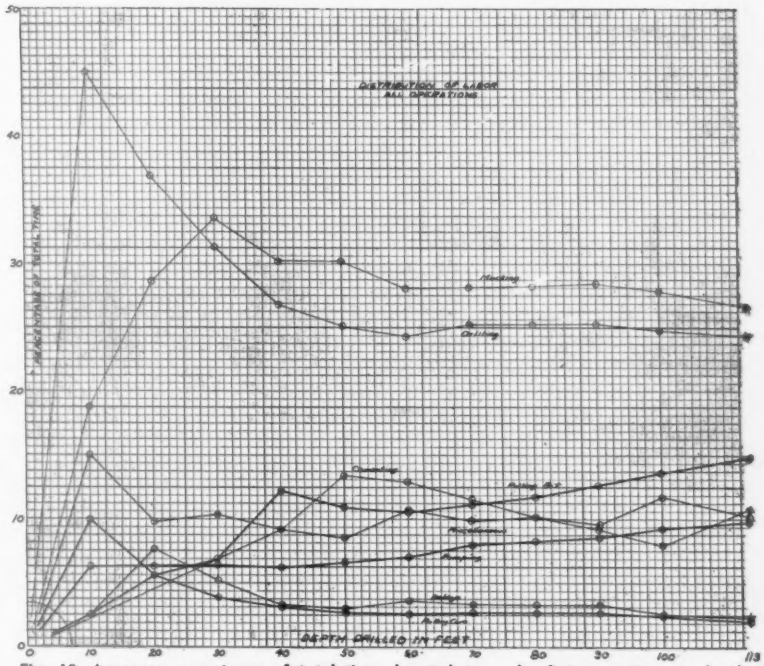


Fig. 18. Average percentages of total time devoted to each of 8 operations as depth of Hole No. 5 progressed

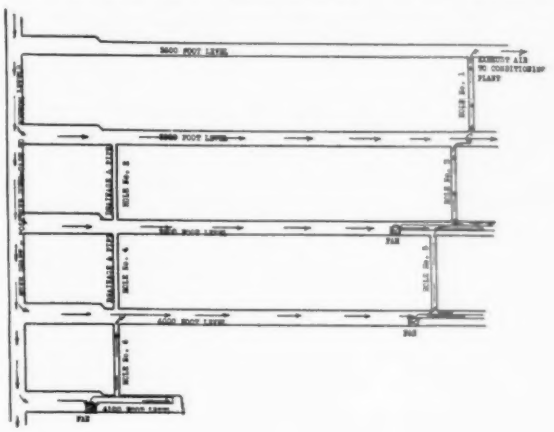


Fig. 19. Longitudinal section showing how Calyx holes are handling exhaust air from bottom levels

There would be an additional cost, that of driving the cross-cuts; however, it is the practice in Butte to connect the levels of the various mines, especially when the two shafts are close together. The cost of driving the cross-cut should therefore not be considered as part of the shaft sinking cost, as it is work that would have to be done later for ventilation purposes.

Calyx drill holes have been helpful and economical in solving ventilation problems in Butte, and future development of uses are anticipated. As equipment and drilling methods are improved, the cost of drilling will be reduced, thus making a wider field available for their use.

Copper Mine Bought by Hardy

Control of the Rio Grande Copper Company, one of the important Mountain City, Nev., mining developments, was recently transferred to R. M. Hardy, of Yakima, Wash., president of the Sunshine Mining Company. Transfer to control to Hardy of the Rio Grande operation was announced following a recent visit to Mountain City of Senator Key Pittman, one of the principal stockholders in the Rio Grande Company.

According to the terms of the new organization, Mr. Hardy will be general manager, with J. A. Davidson, of Mountain City, one of the original locators of the property, continuing as president. Frank Middleton, of Reno, and J. E. Robbins, of Elko, other holdover directors, will continue as vice president and secretary-treasurer, respectively.

Meeting of Northwest Mining Association Announced

The 44th Annual Convention of the Northwest Mining Association will be held at Spokane, Wash., December 8, 9 and 10, 1938.

Surface plant at the Micco mine

Modernization Reopens MICCO MINE

● ***Mechanized Mining Saves West Virginia Community Threatened with Loss of Employment Through Thinning Seam***

By THOS. A. STROUP
Chief Engineer
West Virginia Coal & Coke Corporation
and
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THE West Virginia Coal & Coke Corporation operates six mines in Logan County, one in Randolph County, one in Barbour County, and one in Braxton County, W. Va. This article is confined to the Logan County group, where the company's high-capacity mechanized operations are located, including the Micco mine, which has apparently been rescued from oblivion by a program of mechanization.

Mechanization is not particularly new with this company, having been started in No. 5 mine at Omar in 1935 with a single 11-BU Joy loader. By 1937 this mine was fully mechanized at a production of 2,600 tons with seven Joy loaders. This operation was described in a paper read before the American Mining Congress in Cincinnati in May, 1937.

Much of the company's production comes from seams too thin to be mined by loading machines and mine cars. In No. 19 mine at Stirrat the upper split of the Island Creek seam is worked, which is about 43 in. in thickness. The plant is equipped to handle 3,600 tons per day, all the loading being by hand. In 1935 a 26-in. belt conveyor and four room conveyors were purchased for this operation as a test proposition, with the idea that they would be taken to Micco if developments there warranted.

In this test both hand loading onto face conveyors and machine loading (by 12-BU Joys) directly into the room conveyors were tried out. This equipment is now at Micco; the large amount of development and old workings in No. 19 mine made complete mechanization inadvisable at this time.

In 1934 several units of chain conveyor were purchased for use in driving two rather extensive drainage tunnels through both coal and rock at No. 5 and No. 19 mines. These tunnels required about 18 months to drive, after which the equipment was moved into a test panel at Micco mine, as described later in this article.

The Rossmore mine is also the scene of mechanization trials at the present time. Here both the "double" Island Creek seam and the lower bench (40 in. thick) are mined. The double coal (6 to 8 ft. high) is almost entirely developed and largely pillared out, leaving only some extensive barriers to be extracted.

These are being attacked with a Myers-Whaley loading machine on double or triple shift for rapid extraction, and to permit close timbering for the careful roof control needed when mining between extensive goaves.

The lower bench, which is entered when the parting becomes too thick to be profitably taken, is worked in part by hand loading, but its future depends on mechanization, and a test installation with four shaker conveyors (Goodman) and four duckbills is now being made. These shakers are apparently valuable in driving headings particularly where brushing is necessary, and they are now being given a thorough test in systematic panel work.

The No. 4 Omar mine and the Earling mine have not been mech-

anized, though undoubtedly their turn will come in the course of events, and the same is probably true of the company's mines in other fields.

Mechanization Plans at Micco

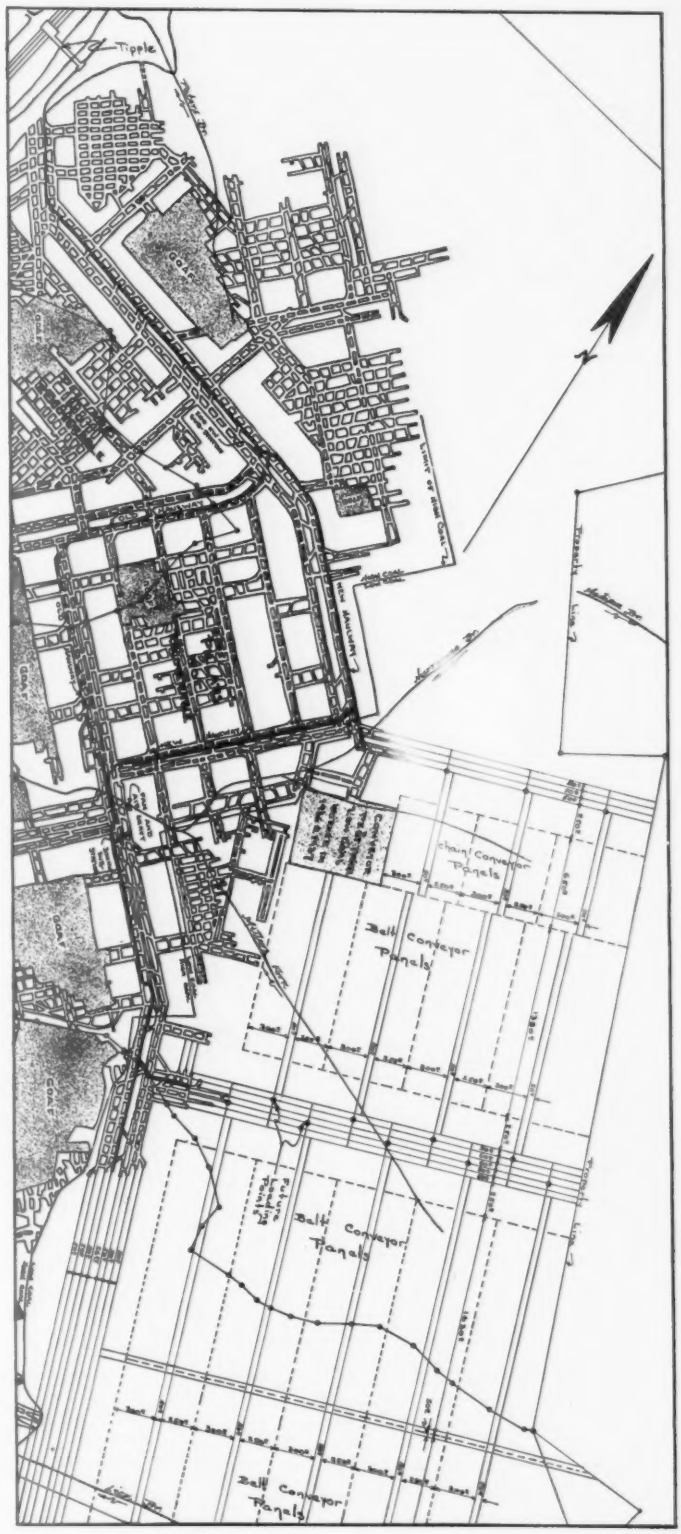
This brings us to the Micco No. 3 mine, where the change from a hand-loading, high coal mine to a mechanized, low coal operation has been most interesting. Not only has this been of prime interest from an engineering standpoint, but also as a study in the effects on labor and social conditions of a well-planned program of mechanization to extend the life of an otherwise hopeless property.

In 1935 it was recognized that the mine could operate only a short time longer in the double or thick Island Creek coal. The workings had everywhere reached the point where the slate parting between the two benches became too thick to be taken. The lower bench (32 in. to 40 in. thick) was known to be excellent coal, but the existing equipment was too high to mine it without prohibitive dead work. Even with low equipment the projected costs on hand-loading seemed so high as to be out of the question.

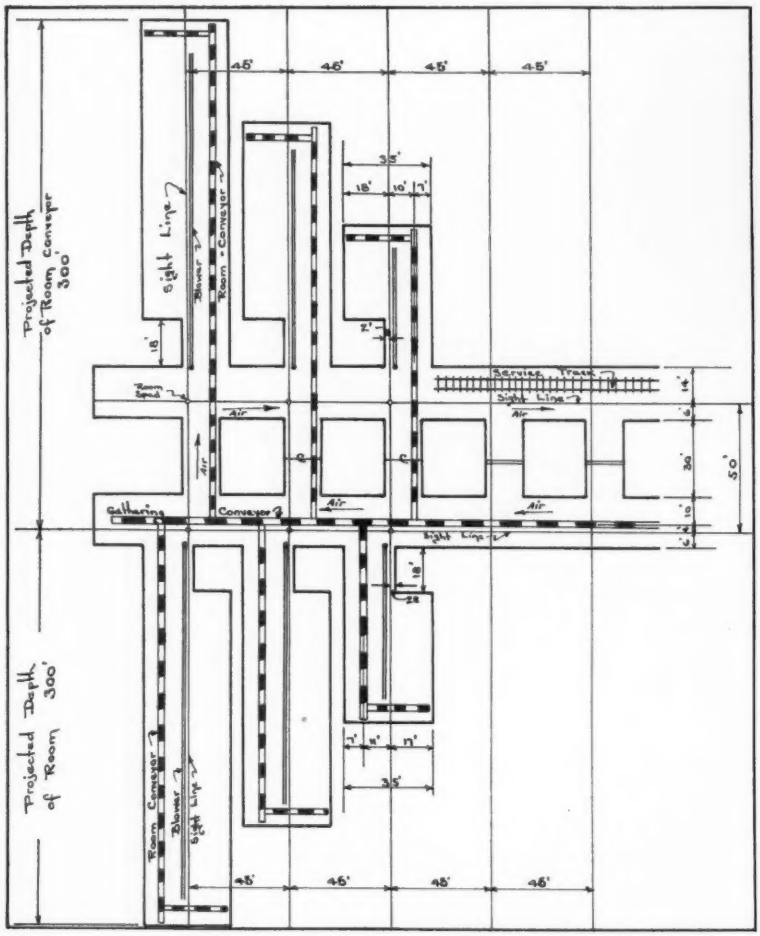
The plant was modern and in good condition, so studies were commenced looking to mechanization as offering a solution not only of reasonable costs but also for the recovery of much valuable coal and continuing the plant in operation for its economic life.

Social Advantages

Another extremely important consideration was the possibility of continuing the employment of the existing labor force and saving the mining community of Micco from utter blight. It seems to be a fact that the abandonment of a coal mine always leaves a residue of the population "stranded" in the town; these people have skill in mining but usually in no other line of work. At the same time a new mine always draws a disproportionate amount of new labor—often men who have never before worked in the mines. Hence the social consequences of shutting down old, high-cost mines in favor of new operations on a lower cost level is unduly magnified, and any method that can be used to extend the life of an old operation is socially more desirable than opening a new mine to replace it. Of course, mines eventually work out, and the workers are perforce deprived of their employment. There are, however, many cases where the introduction of mechanization with its attendant re-



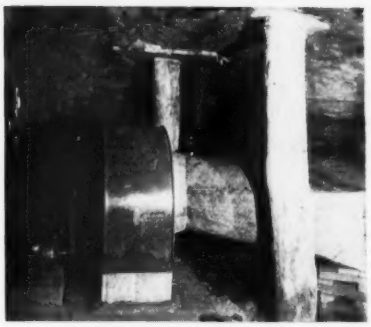
Plan of workings and future development at the Micco mine



Plan of retreat work for room heading panels

quirement of scientific management will enable thin extensions of the seam or other contiguous seams to be worked at a profit. This gives the community a new lease on life, and in the larger view it is a desirable thing to do.

The first step in laying out our program was a thorough investigation of the bench of coal to be mined. All available figures on thickness and continuity were carefully compiled. A number of places were driven for several hundred feet beneath the parting to test the roof and the quality of the coal. All the conditions were found to be reasonably good.



Fan and air filter for ventilating underground substation

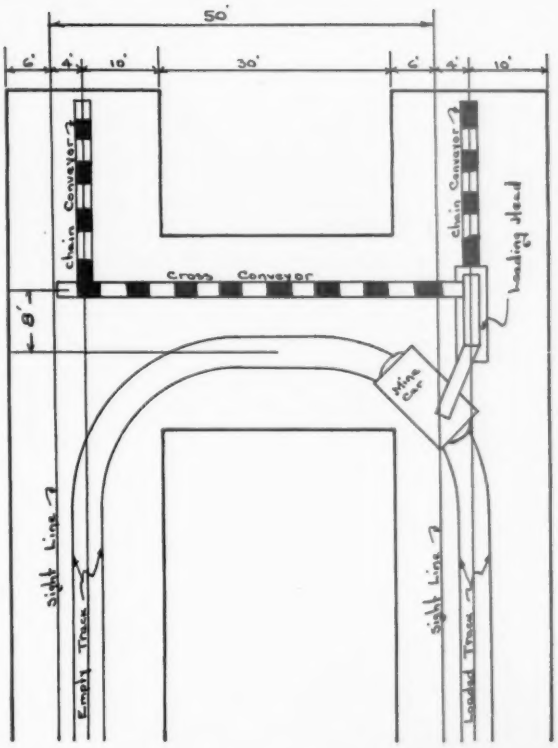
Then in 1936 a test panel 900 ft. by 600 ft. was laid out and worked with conveyors. Two rooms were driven at a time, one on each side of the headings, the coal being taken to the mains on chain conveyors laid in tandem. This test finally proved that conveyor mining was practical, and, of course, the most desirable room widths and pillar thickness were determined. It was also shown that costs within the necessary limit could be reached. This test extended for over a year, during which time all the remaining high coal pillars that could be reached were extracted. Then, on December 1, 1937, the plant was closed for rehabilitation as a mechanized operation.

Modernizing Ventilation and Power

The first step was the installation of a new fan and airshaft. The shaft, 12 ft. by 12 ft. in size by approximately 65 ft. deep, was sunk, and a reinforced concrete lining provided down a distance of 16 ft. to the rock, from which point no lining was necessary. A multi-bladed centrifugal fan was set at the tip of the shaft far enough back to accommodate the steel explosion doors, and connected to the shaft by masonry side drifts and re-

Gathering belt discharging into mine cars

Junction point of room and belt conveyors



Plan for temporary loading point in developing heading and aircourse with chain conveyors

partitioned off from the other sub-station equipment. The building, 20 ft. by 24 ft. in plan, was made of cinder block side walls with concrete floor and foundations, and arranged so that a part of the fresh air from the mine ventilating current passes through the building and directly into the return airways.

This method of ventilation elimi-

inforced concrete roof. The fan is driven by a 30-hp. AC motor housed in a noncombustible building. The site for this installation was chosen with extreme care in order to minimize the course traveled by the ventilating current, and to secure maximum savings in power consumption and the longest possible life before a new installation becomes necessary.

A new 300-kw. underground substation was installed near the foot of the air shaft in order to provide ample power for mechanization. The incoming AC line, a three-conductor "Parkway Cable," was brought down from the surface through the airshaft, and serves a bank of transformers which are set in a fireproof room and

Concrete and steel overcast on haulageway

nates the necessity of a fan or other additional ventilating apparatus for maintaining practical temperatures in the station. This power unit is operated in parallel with the old substation which was built several years ago, and located along the main haulageway about half-way between the new station and the drift mouth.

New Modern Haulageway

Due to the bad condition of the old haulway and to serve new workings more advantageously, it was necessary to build a completely new haulage road from a point near the old substation to the working faces. To provide adequate clearance for the new track, a considerable amount of top shooting had to be done in the old headings which had been driven in the high coal where roof conditions were bad due to a relatively thin parting slate separating the top coal and the "rider" seam. This parting, known locally as "clod," ranged in thickness from 14 in. to 30 in. and extended over the entire length of the haulageway. In some places where the "clod" was thickest and had fallen upon the old timbers, a good part of it had to be loaded out. In most cases, however, the gob was cleaned up and the timbers and track removed before dropping the "clod," after which only leveling up was necessary to prepare the surface for track.

This work was followed by the laying of 60-lb. rail on 6 x 8-in. ties, which was subsequently lined and ballasted with cinders from the company's power plant. Short 4/0 "U" bonds were used with the rail lugs on the outside of the rail, with cross bonds every 300 ft. on straight track and additional ones at all turnouts. Trolley and feeder lines were hung in the conventional manner, and well guarded at all necessary points.

Mechanical Loaders and Conveyors

Upon completion of the general rehabilitation, a test was made, using 12-BU Joy machines loading directly into mine cars. It was understood at the outset that top rock would have to be taken in all places. The test was not particularly satisfactory, due mostly to the small yield of coarse coal, but operating difficulties in con-

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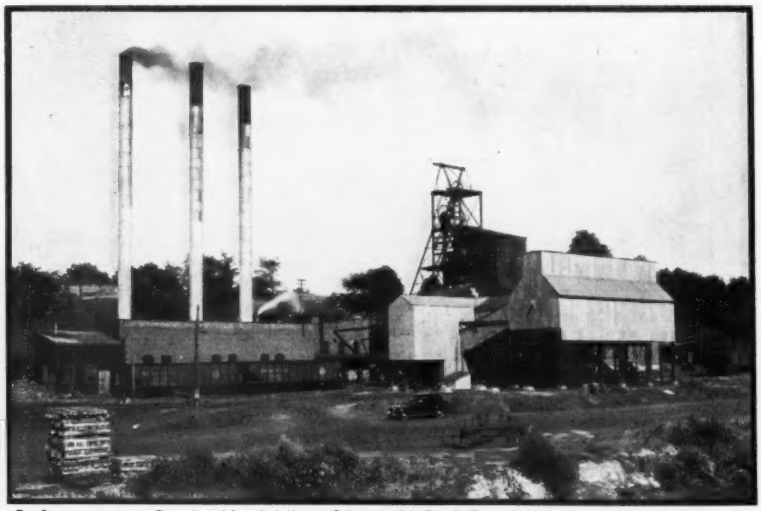
Joy loader loading onto conveyor

Cutting at a conveyor face



Surface plant at Cantine No. 2 Mine of Lumaghi Coal Co. Washed coal bin building at right, with new footings visible at left end. Capacity of bins has been increased 50 percent the past summer

WASHING PLANT AT CANTINE NO. 2 MINE

● ***Moderate Expenditure on New Equipment and Careful Planning of Flow Design Enables Illinois Operator to Meet More Rigid Requirements of St. Louis Smoke Ordinance***

By LOUIS F. LUMAGHI, JR.
President
Lumaghi Coal Co.

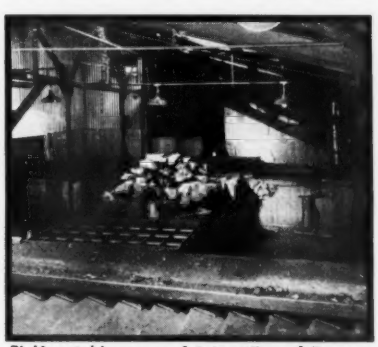
THE Lumaghi Coal Co. operates the Cantine No. 2 Mine at Collinsville, Ill. It is a shaft mine working the No. 6 Seam, and has a capacity of 2,500 tons in 7 hours. Of this tonnage, 90 percent is produced by pit car loaders, and 10 percent by hand. As the mine is located only 16 miles from down-town St. Louis, practically the entire output is loaded in trucks and hauled direct to consumers there and in the surrounding metropolitan area.

Early in 1937, a smoke ordinance was passed in St. Louis which provided, among other things, that no coal under 2 in. could be used there if it contained over 12 percent ash, dry basis. As our screenings then being loaded averaged 16.5 percent ash it was obvious that we had to install a washer to produce coal meeting this specification. Factors influencing the design were as follows, in order of importance: (1) Low first cost, (2) ability to handle the widely fluctuating demands of the truck trade, (3) washed coal must not freeze in the trucks while being delivered, (4) low operating cost, (5) low loss of coal in refuse and (6) low power demand.

Wash Two Sizes in Same Jig

The washing unit selected was a two-compartment diaphragm jig. The compartments are 5 ft. wide and 5 ft. long inside. There are two refuse elevators, one for each compartment. Pulsation is produced by circular diaphragms, sealed to the bottom of the jig tank by flexible rubber rings, and driven by cams shaped to give the type of stroke most suitable for the coal being washed. Length of stroke is adjustable. It was installed as shown in Fig. 1, in the space formerly occupied by the picking table and loading boom for 3-in. x 2-in. nut. During the working shift it washes 3-in. x 1½-in. nut, and on the following shift 1½-in. screenings, which are fed to it out of hopper railroad cars through a track hopper, feeder, and elevating conveyor. These cars are fed to the track hopper either by pulling them back from the load yard by car-puller or caterpillar tractor, or by dropping them down by gravity from the empty yard where they have been set by the regular switching locomotive.

The mine run screens into the following percentage of sizes: 7-in. lump, 17 percent; 7-in. x 3-in. egg, 22 per-



Picking table room—faint outline of jig may be seen in center background

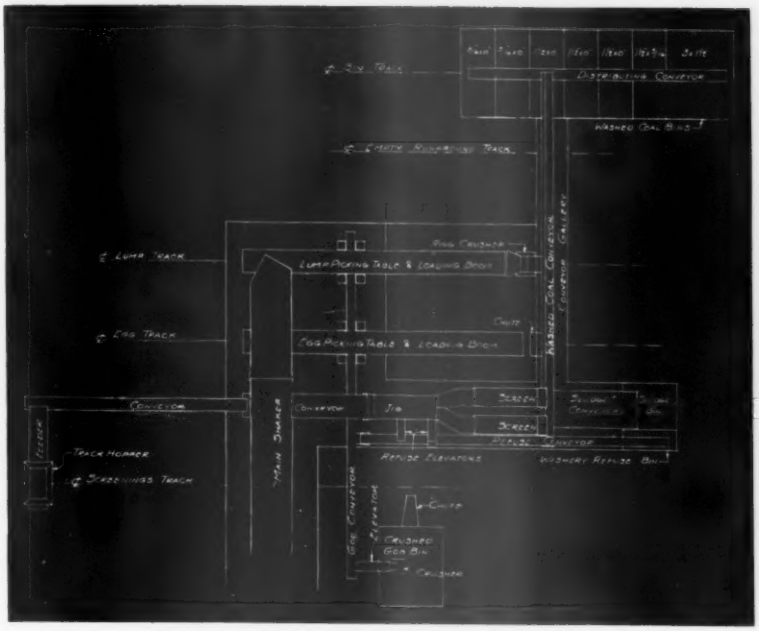


Fig. 1. Plan view of washing plant layout

cent; 3-in. x 1½-in. nut, 23 percent; 1½-in. screenings, 38 percent. The lump and egg are hand picked, and all pickings which have any recoverable coal are sent through the gob conveyor and elevator to an 18-in. x 18-in. single roll crusher located in the top of the gob bin. The crusher is set to make a minus 1½-in. product.

Pickings which are pure rock are piled in the picking room until 4 or 5 tons are accumulated, when they are shovelled on to the table and loaded into a dump truck by the loading boom. As the tipple was originally designed for 500 tons per hour, these interruptions and those caused by loading trucks under the booms do not keep us from getting a full daily tonnage. On busy days the whole production of lump and egg is often loaded directly into trucks under the tipple, no railroad cars at all being loaded.

The 3-in. x 1½-in. nut is fed to the jig by part of the former picking table arranged as shown in Fig. 2. Refuse from the first compartment is carried on the upper run of the refuse conveyor to the washery refuse bin. Refuse from the second compartment contains much attached coal and is put on the lower run of the refuse conveyor so as to be carried back to the gob conveyor, where it joins the pickings and goes to the gob crusher. Washed 3-in. x 1½-in. nut is dewatered on two 14-ft. x 4-ft. double-decked horizontal vibrating screens, where it is also sprayed with clear water. It is then carried by an inclined scraper conveyor to the bins, where it passes through the distributing conveyor to bin No. 7. There it is lowered by a spiral to avoid breakage. There is a gate in the inclined conveyor over a chute at the end of the egg boom, so that the washed nut can be mixed with the egg to make 7-in. x 1½-in. egg.

Screenings Bypassed During Day and Washed on Night Shift

The raw 1½-in. screenings are loaded into hopper cars. As they are dropped past the crushed gob bin, they are topped off with this material through a chute. By the time these cars are dumped into the track hopper and the contents carried through the conveying system to the jig, the crushed gob is well enough mixed so as to give no trouble in washing. On the night shift this coal is washed.

Refuse from both compartments is run to the washery refuse bin, the second refuse elevator being equipped with a gate so that it can feed onto either the upper or lower run of the refuse conveyor. The washed screenings are sluiced to the vibrating screens, which are covered with wire cloth with 5/16-in. square openings on the top deck, and .02-in. x 2½-in. openings on the lower. The water through the screens, containing minus .02-in. material, is flumed to a settling tank equipped with skimmer weirs to take clear water off the surface. The sludge settles to the bottom and is elevated to a bin by a slow-moving scraper conveyor. Both sludge and refuse are hauled to separate dumps by truck.

The 1½-in. x 5/16-in. stoker and the minus 5/16-in. carbon fall into separate compartments in the inclined conveyor. At the discharge end, the minus 5/16-in. may be put on the top run of the distributing scraper conveyor and then into bins No. 1 or No. 2, or it may be put on the lower run to be remixed with the 1½-in. x 5/16-in., making 1½-in. screenings which are put in bins Nos. 3, 4 or 5. The 1½-in. x 5/16-in. is always run to bin No. 6, where a spiral prevents degradation.

Simple Pumping System for Water Supply

The jig is supplied with water by a 2,000 g.p.m. centrifugal pump, located at the side of the concrete settling tank, and getting its water from a sump in the tank supplied by weirs. Surplus water goes to the head tank and overflows to a pond, where the extremely fine sizes settle. Fresh water is pumped back from the pond to sprays on the screens by a 200 g.p.m. triplex pump. Makeup water is fed into the pond. This simple system has worked very well even though the pond originally had a capacity of only 175,000 gallons.

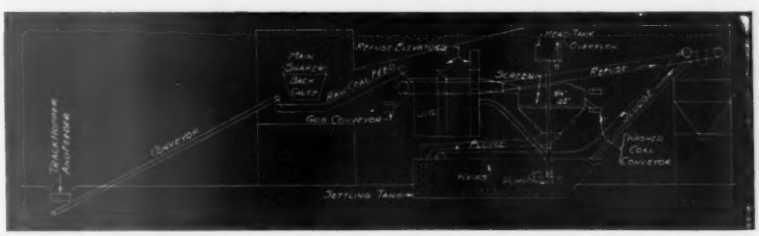


Fig. 2. Elevation showing arrangement of washing unit

The bin is shown in cross-section in Fig. 3. It is a suspension bunker 19 ft. wide and 60 ft. long placed high enough over a track so that

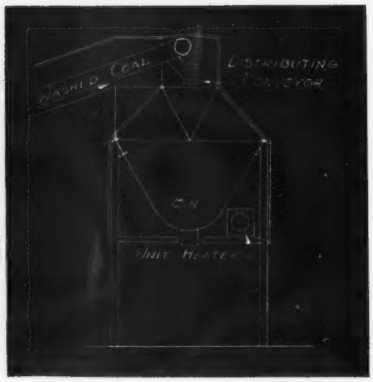


Fig. 3. Cross section of washed coal bin—unit heater prevents freezing of coal during short time coal is in bin in the winter

either cars or trucks may be loaded. It has one bin of 72 tons capacity and six of 36 tons. There is a floor under the bunker and the sides are covered, forming a roughly triangular space on each side. A large unit heater in each space keeps the bins warm so that the coal will not freeze in the hour or two necessary to deliver it by truck. When cars are loaded, calcium chloride is used in cold weather. Chloride is also used to keep ice from forming on the ground under the bins. The combined dewatering of the screens and bins results in surface moisture approximately as follows: 3-in. x 1½-in., 1 percent; 1½-in. x 5/16-in., 2 percent; 1½-in. x 0-in., 5 percent; 5/16-in. x 0-in., 10 percent. This is low enough so that loaded trucks will not drip water, nor will the coal freeze while being delivered.

Recoveries and Costs

This coal is not hard to wash, as there are no clay impurities, little bone, and the slate and pyrites are much higher in specific gravity than the coal. The jig will handle up to 150 tons per hour of raw 3-in. x 1½-in. nut, and make a satisfactory product of slightly over 11 percent ash (dry). It will handle 120 tons per hour of 1½-in. screenings, and reduce the ash to 11 percent (dry) with about 4 percent float in the refuse. When washing screenings we make occasional sink and float tests at the washing gravity of 1.5 on both the washed coal and refuse. When washing nut, we try to make the washed coal look as well as possible, because if we do throw out an excessive amount of coal in the second refuse elevator we know we will recover it as screenings. This is important because the larger sizes are sold very much on appearance. Average recovery (November, 1937 to February, 1938, inclusive) was as follows:

	3" x 1½" Nut *Percent*	1½" Screenings *Percent*
Washed Coal	91.7	82.2
Refuse	7.6	9.0
Sludge	.7	8.8
	100.0	100.0

Operating cost, including labor, supplies, switching, and chloride, but not depreciation or power, were 6.1 cents per ton of raw 3-in. x 1½-in. nut washed and 12.5 cents per ton of raw 1½-in. screenings. This also includes labor used in loading trucks, and cost of refuse and sludge disposal, which is about 15 cents per ton dumped.

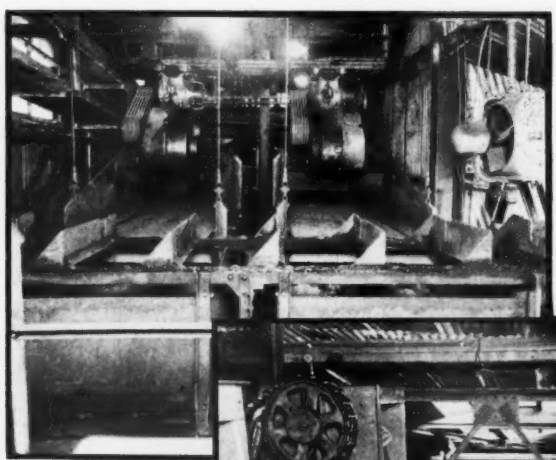
Perform Service Usually Left to Retailer

We have found this plant well suited to our rather peculiar operating conditions. As our coal is hauled direct to the consumer by truck, the dealers who handle it generally have none of it in storage as they would if they had it shipped into St. Louis by rail and then delivered it by truck. They depend on us for the service normally rendered by the retail yard.

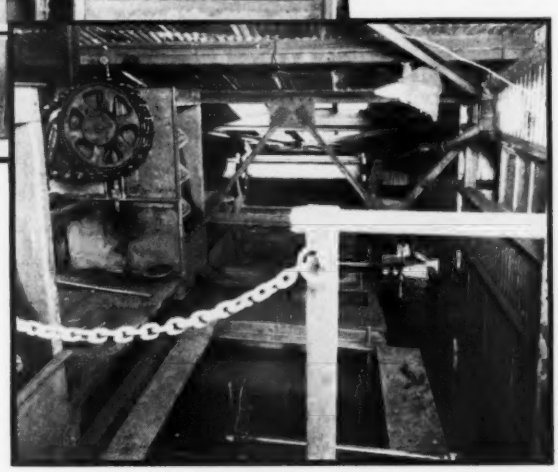
This means we must be prepared to supply during cold waves a tonnage in excess of what we can actually produce. For instance, in the week of January 2 to 9, 1938, we ran the maximum of five days, and hoisted 12,005 tons of raw coal, making 11,093 tons of prepared coal. We actually sold 13,972 tons by truck and 541 tons by rail, a total of 14,513 tons or 32 percent more than we produced.

Adding to the difficulty of giving service is the fact that we regularly carry for sale 10 different sizes. We are able to do this because we can keep on hand 4,000 tons in hopper cars in our load yard, which can be switched to a truck loading plant consisting of six concrete silos each of 140 tons capacity, filled by an automatic monorail bucket. We also have a conveyor in a pit under a track which can unload cars directly into trucks, either with or without rescreening the coal.

As we sell coal 12 hours per day and the mine runs only 7 hours, we use these facilities the balance of the time and on idle days. The washer running 14 hours provides a constant supply of washed coal, very little of which has to be loaded in cars on account of the storage capacity of the bin. This resulted in our using only



Left: Two 14' x 4' double deck horizontal vibrating screens for dewatering and sizing the washed coal. Washed coal conveyor in foreground



Right: View of top of both compartments of jig. Old picking table elevated and used for feeder may be seen in background

Conveyor for unloading cars into trucks. Building at right contains a vibrating screen for rescreening coal before loading, if desired

25 tons of calcium chloride last winter, a rather warm one.

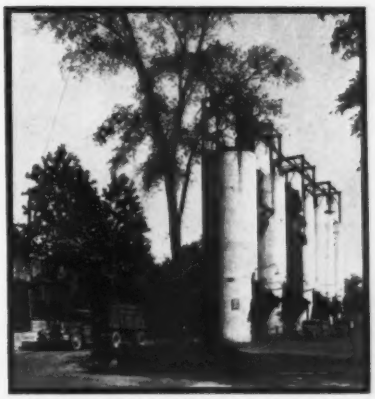
It will be noted that there is a crusher over the lump track at the end of the loading boom under the washed coal incline conveyor. This is a 42-in. ring mill. In the summer when only 1½-in. washed screenings are in demand, we crush 3-in. lump to minus 3-in., and load raw 3-in. screenings. This coal is then run through the washer, in which the top decks of the dewatering screens have been changed to 1½-in. The minus 1½-in. goes to the washed coal bins, and the 3-in. x 1½-in. goes through a gate and a chute to the crusher, which has been reset to 1½-in. In this way the whole output can be made into minus 1½-in. washed steam coal.

The weak point of this plant is the excessive sludge loss. The sludge contains only 17 percent ash (dry), and a large part of it could be recovered. However, most of our screenings are sold for use on chain-grate or small under-feed stokers, and removing these fines allows the air to pass through the coal more easily, giving better combustion. In the future we intend to burn them in our power plant. Two of our six boilers have pneumatic spreader type stokers, and when we equip the rest we will be able to take out the dust from the screenings before they go to the washer, and burn it dry. This will utilize practically all the recoverable values in the raw mine run.

Investment Held to Minimum

The investment was held down as much as possible by incorporating the washer in the tipple and arranging the conveyors and bins so as to make the best use of existing track arrangements. The refuse and sludge conveyors are both driven by the same gear-motor. The feeder under the track hopper was made from an old loading boom brought from our other mine. This feeder is geared to the elevating conveyor to which it delivers, which in turn is driven by the countershaft which drives the loading booms. The first cost was approximately $64,000, including the pond and pipe lines, but not including the crushers, which are on hand. Of this, the washed coal bin cost about $14,000. The motors operating the washing plant total 98 hp.

The Jeffrey Mfg. Co. supplied the jig and the conveying equipment. The dewatering screens were made by Allis-Chalmers Mfg. Co., and the main circulating pump by Fairbanks-Morse. A local steel fabricator supplied the



Silo plant for handling coal from cars to trucks

washed coal bunker and the refuse bins. Installation of the machinery and remodelling of the tipple structure was handled by the mine force.

Stevens County, Washington, Developments

Stevens County, between Spokane, Wash., and the Canadian boundary, never ceases its mining activity. Some of the districts at times rise into prominence, then fade away, usually to come to the front again years later. In the extreme north the Red Top, financed in Minneapolis, is engaged in active development. Nearby, the Electric Point, once a dividend payer, is being worked by leasers who are shipping high-grade ore which carries as high as 78 percent lead. The ore comes from the old 400-ft. level and some from the newer 600-ft. level.

At Northport an attempt is being made to refinance in a small way and rebuild the old Northport smelter, to use one of the new experimental processes. At various points along the river in this part of the county other mining is in progress. One of these projects is that of Ark Mines Company, which has the Silver Queen mine near Kettle Falls. J. J. Budd, president, reports the new 50-ton mill doing good work and that all the outstanding indebtedness will soon be paid.

Tungsten Producers Company, owned by General Electric, is the biggest mining enterprise in the county—and least is said concerning its activities. The question of the title to its holdings in southwestern Stevens County is being brought into court for adjudication. Prior to and during the first years of the war it was owned by German interests which shipped large quantities of tungsten to Germany for munition uses. The property was taken over by the United States alien custodian, then passed to Stevens County for delinquent taxes, then to various owners before the General Electric Company acquired it.

There is considerable mining in the Deer Trail district of this county which at one time was a rich silver producer, and mining is being revived in the silver-copper district about Chewelah. At Chewelah is the biggest magnesite producer in the United States, the Northwest Magnesite Company, which recently resumed operations, employing 300 men. It ships its processed magnesite to eastern steel mills.

Contract For Power Lines

General Cable Company has been awarded a contract to build the third power line from Boulder Dam to the city of Los Angeles. About 6,000,000 lbs. of copper will be used in construction of the line.

With the **COAL DIVISION**

of the **AMERICAN MINING CONGRESS**

COAL SCREENING

A Report Prepared by the District Committee of Southern West Virginia

THIS report describes the screening practice at a mine in Southern West Virginia, operating in the Island Creek seam. This coal breaks with a cubical fracture and shows a grindability of 50.1 percent for the 0 x 2 inch size. The free or surface moisture ranges from 1½ percent to 2½ percent with an average of about 2 percent in the 0 x 1¼ inch sizes passing Units No. 1 and No. 2.

In this plant the ROM is fed at the rate of 500 tons per hour to a shaker (Unit No. 1) with a 14° slope and a speed of 101 six-inch strokes per minute for preliminary screening. The feed is separated into plus 5-in., 1¼ x 5-in., and 0 x 1¼-in. sizes. To prevent too much of the 0 x 5-in. size from going immediately to the 1¼-in. lip screen in the lower deck of the upper shaker, the coal is passed over a lip screen first, and then to the 5-in. round hole screen—one section of which completes the top deck of the upper shaker and the other section is on the lower shaker.

From this screen the plus 5-in. coal goes to a loading boom, the 1¼ x 5-in. coal goes into a conveyor leading to the wet washer, and the 0 x 1¼-in. goes to a high speed shaker (Unit No. 2) for removing the 0 x ¼-in. sizes on 192 sq. ft. of 14 gauge stainless steel plates with 5/16-in. square perforations. This screen is driven from roller bearing eccentrics, ¾-in. stroke, 460 r.p.m., 10° slope. The screen is in two sections, one above the other, each section taking half of the load; the ¼ x 1¼-in. product joins the 1¼ x 5-in. product going to the wet washer. The 0 x ¼-in. size coal goes to the dry cleaning plant.

After the ¼ x 5-in. coal has passed through the wet washer it is sluiced to a set of Parrish Type shaking screens (Unit No. 3) with a slope of 7°, 4½-in. stroke, 155 r.p.m. The upper shaker has three decks screening the coal at 2 inch and 1¼ inch through round hole plates on the top and second decks, while the third has ⅛-in. x ½-in. openings in the No. 33 Allegheny metal plates for dewatering the ¼ x 1¼-in. sizes. In the sluice-way ahead of the shakers there is a section of the same plate for dewatering which is not included in the data shown. In the single deck of the lower shaker

SCREEN AREAS, TONNAGES AND MOTIONS

Unit No. 1	Top Deck Upper and Lower Shaker	Lower Deck Upper Shaker
Screen area, sq. ft.	174	129
Size of perforations	3″ Lip and 5″ Rd.	1⅛ x 1¼ x 1½
Max. size over screen	18	5″
T.P.H. over screen	110	225
T.P.H. through screen	390	165
T.P.H. per sq. ft. through	2.24	1.28
Slope degrees	14 and 16	14
Stroke inches	6	6
Stroke per min.	101	101

Unit No. 2	Top Shaker	Lower Shaker
Screen area, sq. ft.	96	96
Size of perforations	5/16″ sq.	5/16″ sq.
Max. size over screen	1¼″	1¼″
T.P.H. over screen	55	55
T.P.H. through screen	27.5	27.5
T.P.H. per sq. ft. through	.29	.29
Slope degrees	10	10
Stroke inches	¾	¾
Stroke per minute	460	460

Unit No. 3	Top Deck Upper Shaker	Top Deck Lower Shaker	Second Deck Upper Shaker	Bottom Deck Upper Shaker
Screen area, sq. ft.	90.6	55	102	93
Size of perforations	2″ rd.	3″ rd.	1¼″ rd.	⅛ x ½″ slots
Max. size over screen	5″	5″	2″	1¼″
T.P.H. over screen	149	90	54	102
T.P.H. through screen	161	59	107	5
T.P.H. per sq. ft. thru	1.78	1.07	1.05	..
Slope degrees	7	7	7	7
Stroke inches	4½	4½	4½	4½
Stroke per minute	155	155	155	155

Unit No. 4	1 deck
Screen area, sq. ft.	126
Size of perforations	⅛″ x ½″
Max. size over	1¼″ rd.
T.P.H. over screen	100
T.P.H. through screen	2
T.P.H. per sq. ft. thru	.016
Slope degrees	12
Stroke inches	1
Stroke per min.	320

Screen Sizes of Coal From Screens
Unit No. 1—Feed 500 T.P.H. ROM

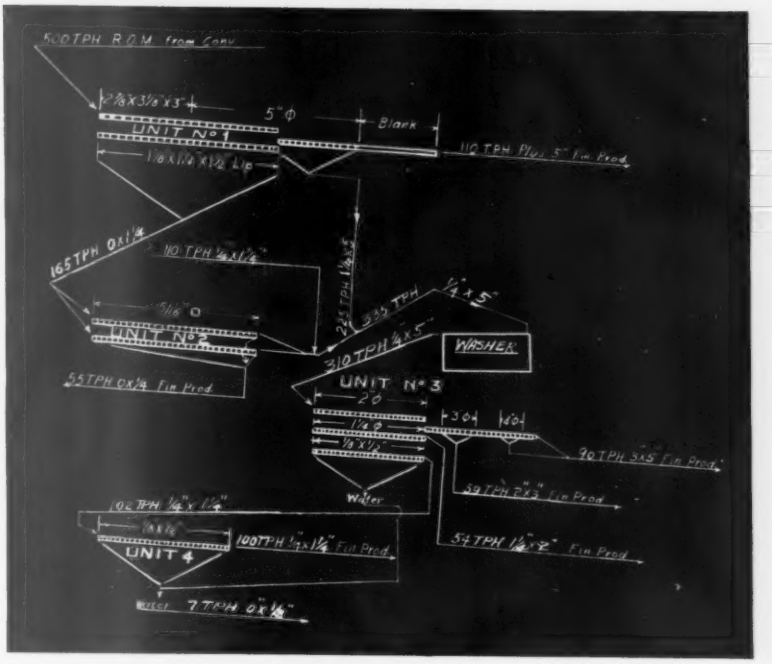
	Percent	T.P.H.
5"	22	110
1¼ x 5"	45	225
0 x 1¼"	33	165
Total	100	500

Unit No. 2—Feed 165 T.P.H. 0 x 1¼"

	Percent Feed	Percent ROM	T.P.H.
¼ x 1¼"	66.7	22	110
0 x ¼"	33.3	11	55
Total	100.0	33	165

Unit No. 3—Feed 310 T.P.H. ¼ x 5"

	Percent Feed	Percent ROM	T.P.H.
3 x 5"	29.2	19.6	90
2 x 3"	19.0	12.7	59
1¼ x 2"	17.6	11.8	54
¼ x 1¼"	32.1	21.5	100
Minus ¼"	2.1	1.4	7
Total	100.0	67.0	310



Flow diagram

are two sets of round hole screen plates —one of 3-in. opening and one of 4-in. opening. Since the 4-in. plates are so seldom used, no data for them are given. From this shaker the 3-in. x 5-in. and the 2-in. x 3-in. go to their respective loading booms, the 1¼ x 2-in. product goes into a conveyor leading to one of the three blending bins, and the ¼-in. x 1¼-in. comes off the lower deck of the upper shaker directly to the drying screen.

The drying screen (Unit No. 4) has the same kind of screen plates as used for dewatering, and is of a high speed shaking type supported on short flexible steel hangers. Hot air is sucked through the coal on the screen to reduce the moisture content, and from here this ¼ x 1¼-in. size goes to one of the blending bins.

Screen Surfaces—Details of Screen Plates

	Unit No. 1—Raw Coal				*Unit No. 2—Raw Coal*	
		Top Deck 0 x 5 Out of ROM		Lower Deck 0 x 1¼ out of 0 x 5	0 x ¼ out of 0 x ¼"	
Feed	end	end	end	top	end	end
Width screen	5-5½	5-5½	5-5½	5-6½	4-9½	4-9½
Length screen	11-8½	7' 6"	12' 8"	23' 2"	20'	20'
Area, sq. ft.	64	41	69	129	96	96
Type perforations	E	A	A	E	C	C
Dimens. perf.						
a	2⅞"	5"	5"	1⅛"	5/16"	5/16"
b	3⅛"	5⅝"	5⅝"	1¼	5/16"	5/16"
c	3"	6½	6½	1½	7/16"	7/16"
d	3"	..	..	1½	..	..
Thickness	¼"	⅜"	⅜"	¼"	14 ga.	14 ga.
Material	steel	steel	steel	steel	alloy steel	alloy steel

	Unit No. 3—Washed Coal				*Unit No. 4 Washed Coal*
	Top Deck —2 and 3" out of ¼ x 5"		2nd Deck —1¼ out of ¾ x 2	3rd Deck Water and Sludge out of ¼ x 1¼"	Single Deck Drying Screen
Feed	end	end	top	top	end
Width screen	6' 5"	5' 10"	6' 5"	7' 4¼"	7' 0"
Length screen	14' 1"	9' 6"	15' 10½"	12' 8"	18' 0"
Area screen	90.6	55.4	102	93	126
Type perforations	A	A	A	B	B
Dimens. perf.					
a	2"	3"	1¼"	⅛"	⅛"
b	2¼"	3¼"	1 13/32"	½	½"
c	2⅝	3¾	1⅝	¼	¼
d	30°	30°	30°	⅛	⅛
Thickness	¼	¼	¼	14 ga.	14 ga.
Material	steel	steel	steel	alloy steel	alloy steel

DEMAND DIVERSITY in SEVERAL POINTS of POWER SERVICE

By M. W. HORGAN*

FEW tests, if made, have been published on the problem of demand diversity by the mining industry. It has often been asked, and rightly, by power company customers, whether a saving could be made in their power bills by building their own lines from the original point of service to each bore hole or substation on their property where additional service was desired. A heavy question, to be sure.

The first answer is to recommend actual metering at the source, and a checking against the billing demand at the several service points. Billing demand is, of course, the added integrated demand of each service point. The second answer is to recommend a study of what discounts the operator received from the power company on a received voltage basis. These results, when balanced, will tell the story. Tests made in this manner for many coal companies having heavy and average production show over a definite test period that the maximum "sandwiching" or diversity in billing demand rarely exceeds 7 percent.

The average diversity I found to exist in the demands where two points of service are supplied to a mine, interconnected underground, is 5.3 percent. In spite of the great amount of detailed work involved in studying the individual cases and determining the average of the three highest coincidental daily demands each month for a period of three months in each case studied, the results cannot be considered conclusive as to the exact diversity to be expected in any given case. However, these results do indicate, very definitely, that the range of diversity is between 3 percent and 7 percent. It is probable that in any given case the diversity over a period of a year would not exceed 7 percent.

The diversity between two points of service to the same mine where the service points are electrically interconnected, is not greater than the diversity between services to independent mines. The study indicated a greater amount of diversity in the case of independent mines than in any of the cases of interconnected services. This might be due to the fact that only one case of the former type was studied, or it may be due to the fact that scheduled operation of the interconnected service has resulted in lower diversity.

Inter-Connected Service Points	Observed Diversity Percent	Two-Point Diversity Percent
Mine No. 1	3.412	3.412
Mine No. 2	6.995	6.995
Mine No. 3	9.009	5.528
Average Diversity		5.312

Another, among several similar tests, showed in a normal working month a demand diversity of 2½ percent. The succeeding month showed no diversity whatever. The latter test was made by installing G-9 demand meters in the 22,000 volt substation serving three points at 2300 volts. When the demand charts were brought in for billing, the sum of the billing demands was compared with the average of the three highest demands recorded at the main substation.

If a sensible demand diversity can be shown by test, the billing demand will necessarily be reduced. Most power schedules are based on load fac-

(*Concluded on page* 40)

Mine No. 1

		Billed			Matched		
Service Point No. 1		KW Peaks	RKVA	KVA	KW Peaks	RKVA	KVA
K equals 2.88	Aug., 1937	55-55-54	12-10-9	161	53-54-50	10-8-8	150
	Sep., 1937	58-58-56	12-11-10	169	54-52-58	10-8-12	161
	Oct., 1937	62-61-59	10-13-10	178	61-58-59	13-10-10	174
Total				508			485
Service Point No. 2		P. F. Percent			P. F. Percent		
K equals 4.8	Aug., 1937	53-52-51	100	250	52-51-53	100	250
	Sep., 1937	51-50-50	100	242	50-50-50	100	240
	Oct., 1937	59-52-51	100	260	51-50-50	100	242
Total				752			732

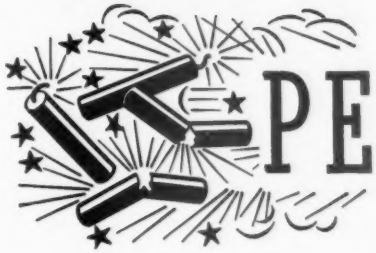
	KVA Billed	KVA Matched
Service Point No. 1	508	485
Service Point No. 2	752	732
Total	1,260	1,217
Difference	43 KVA	
Percent Diversity	3.412	

Mine No. 2

		Billed			Matched		
Service Point No. 1		KW Peaks	P.F. %	KVA	KW Peaks	P.F. %	KVA
K equals 4.8	Aug., 1937	80-78-77	100	376	71-79-69	100	351
	Sep., 1937	80-76-74	100	368	63-65-80	100	333
	Oct., 1937	83-81-80	100	391	76-74-75	100	360
Total				1,135			1,044
Service Point No. 2		RKVA			RKVA		
K equals 5.76	Aug., 1937	54-54-53	0-0-0	310	48-47-49	0-0-0	277
	Sep., 1937	50-48-48	0-0-0	281	50-48-41	0-0-0	267
	Oct., 1937	55-53-50	0-0-0	304	55-53-48	0-0-0	300
Total				895			844

	KVA Billed	KVA Matched
Service Point No. 1	1,135	1,044
Service Point No. 2	895	844
Total	2,030	1,888
Difference	142 KVA	
Percent Diversity	6.995	

* Mr. Horgan is a member of the Power Committee of the Coal Division, and has submitted this article, not as a report, but for discussion and comment.



PERMISSIBLES

Senator James Hamilton Lewis of Illinois, freshly back in Washington, suggests that the war debt problem be settled by foreign debtors issuing bonds payable to future generations of Americans. . . . As if the future generations don't have troubles enough ahead of them without war debt bonds! . . .

■

Scientists have now proved that living fish can be frozen for long periods of time and then thawed out and live again. . . . Well, maybe there's still hope for the Republican party. . . .

■

Out in Washington a mule has been elected to a minor office. . . . And we're still trying to figure out whether the joke is on the mule or the voters. . . .

■

Well, it looks like the urge to purge has been submerged. . . .

■

The small sized paper currency is now nine years old. . . . And still harder to get hold of than the larger size used to be. . . .

■

With all this trouble abroad its a mighty good time for Americans to stay at home and tend strictly to their own business. . . . There's plenty to do here. . . .

■

"A liberal," says Senator Carter Glass, "is a man who is willing to spend somebody else's money. A conservative is a man with good sense." . . . And just as soon as those definitions are accepted as standard, the Government debt is going to drop suddenly. . . .

■

It might be the Beautiful Blue Danube in song but it isn't in fact—nowadays. . . .

One question you don't hear much these days is—Where will we get the money? . . .

■

A Government survey discloses that the average American spends $38.50 on his vacation. . . . Think what it would be if he didn't have to spend twice that much for taxes. . . .

■

It looks like Florida is letting California get ahead of her. . . . She hasn't figured out a better plan than the $30 every Thursday yet. . . .

■

Notre Dame ought to be able to get together a football squad from some of the nominees for positions in the next Congress. . . . Maciekewski . . . Gaarenstroom . . . Allesandroni . . . Kazorski . . . Wasielewski . . . Loriks . . . .Routzohn . . . Thorkelson. . . .

■

A newspaper columnist describes Messers Corcoran and Cohen as the "President's odd job men." . . . Well, loads of people will agree about the "odd." . . .

■

The anti-New Dealers can reflect that, after all, a President of today is just a picture on a postage stamp tomorrow. . . .

■

A science bulletin quotes an eminent authority to the effect that half of the doctors would starve to death if people would learn to control their emotions. . . . Yeh, and about 90 percent of the politicians would be hungry, too, if the same thing occurred. . . .

■

Washington is going to "solve" its parking problem by installing 310 parking meters. . . . With 200,000 automobiles scrambling for room, the idea sounds about as practical as the once ballyhooed shelter belt of trees through the middle of the country. . . .

For clarity and honesty of expression, political candiates may want to borrow a leaf from the book of C. L. Cowart, who declined to accept the Georgia Prohibition party's nomination for governor. . . . Said Mr. Cowart: "—In the first place, a candidate on the Prohibition ticket has no more chance of winning than a Democrat in Vermont. . . . In the second place, I don't know any more about running the office of chief executive of this State than do the others who have been in that office for the last 20 years. . . ."

■

An amusement park employe in Des Moines has been working on a merry-go-round for 20 years. . . . Anybody who has tried to find out something from a Government department knows just how he feels. . . .

■

Every President elected at 20 year intervals since 1840 died in office, a recent survey discloses. . . . That isn't going to slow up the scramble to be the President in 1940. . . .

■

Federal Government income last year was more than five billion dollars, the highest in history. . . . It's still got a long way to go to catch up with expenses. . . .

■

Mrs. Roosevelt says that the reason she doesn't write out her speeches in advance is that if she doesn't have to think about what she is saying, she becomes bored with her own conversation. . . . Well, that explains those long yawns you hear at the political rallies. . . .

■

Now that the mines have opened in Montana they may have to advertise for WPA workers before long. . . .

■

If you think raising money to promote a business is tough just try getting the SEC to approve a securities issue to start a mine! . . .

APPLICATION of RECIPROCAL TRADE to MINING*

● ***Treatment Accorded Lead and Zinc in Forthcoming British and Canadian Pacts Held a Fair Test of Future of Metal Mining Under the Act***

By EVAN JUST
Secretary
Tri-State Zinc & Lead Ore Producers Association

NO MATTER how interested or indifferent you may be personally, you cannot escape the consequences of reciprocal trade. If you are a producer, a fabricator, a salesman, an importer, or an exporter, your occupation is being influenced. In any case, as a private citizen you have so much at stake that you cannot afford to be ignorant of what is being carried on through the reciprocal trade agreements.

Up to the present time reciprocal trade has not affected mining in general to an extent that enables us to analyze fairly what the effect of the policy will be when it matures. This paper is therefore intended as a progress report to carry forward from the excellent introduction to the subject given to this Congress in 1935 by Herbert Wilson Smith.

The reciprocal trade policy was inaugurated by the Trade Reciprocity Act of 1934, which was renewed in 1937 and, unless renewed again, will expire on March 1, 1940.

The Tariff Act of 1930, which is still in force except as amended by the reciprocal trade act, empowers the President, upon recommendation of the Tariff Commission, to alter the enumerated rates up to 50 percent. The Trade Reciprocity Act authorizes him to transact agreements with foreign nations and to raise or lower the statutory rates 50 percent. Offhand, this seems like duplication, but in practice the two plans are quite different. The flexible provisions of the tariff act function as a domestic instrument, and under them increases are, if anything, more likely than decreases. Because the Trade Reciprocity Act provides for direct negotiation with foreign representatives it is most unlikely that rate increases will be created, as they would provide no incentive for coming to terms. Naturally such bargaining consists of trading concession for concession, and the effect has invariably been to reduce rates.

Effect of Most-Favored-Nation Clause

The Trade Reciprocity Act further authorizes the President to extend the changes in rates granted in an agreement to all other nations, and to deny the benefits to nations discriminating against us. In effect this means that the concessions we make in any agreement are automatically made available to virtually all the countries of the globe. With the most-favored-nation clauses contained in treaties we have with most of the commercially important countries, it would be difficult to operate the reciprocal trade policy in any other way. At the present time the only country to whom we deny participation in concessions is Germany. Negotiation of a lowered rate in a given agreement is therefore practically equivalent to a general reduction of the rate involved.

As was emphasized by Mr. Smith, it is important to realized that in spite of its apparent flexibility, the machinery, spirit and effect of the reciprocity act are aimed in the direction of tariff reductions.

Trade Agreement Procedure Outlined

The procedure for negotiating a trade agreement is rather complicated. To handle trade agreements there has been set up in the State Department a separate Trade Agreements Division. If the officials of this Division believe that a new trade agreement is feasible, they submit a preliminary report to the Trade Agreements Committee, which consists of representatives from various branches of the Government, including the Tariff Commission and the Departments of State, Commerce, Treasury, and Agriculture. It has several inter-departmental subcommittees: a Planning Committee; Country Committees, appointed to handle affairs pertaining to a given country; and Commodity Committees whose tasks involve given classes of articles of commerce.

If the Trade Agreements Committee tentatively approves the project in hand, a new Country Committee is appointed, which undertakes extensive studies to determine what items shall be considered in negotiations and the extent to which concessions should be sought or offered. In its investigations the Country Committee draws on sources of information from various

* Presented to 5th Annual Metal Mining Convention, American Mining Congress, Western Division, Los Angeles, Calif., October 25, 1938.

departments of Government. While this Committee is deliberating, the State Department sounds out the country concerned as to its attitude in general and the commodities in which it is interested.

After the Country Committee hands in its schedules to the Trade Agreements Committee, its findings are reconsidered by the latter. When they are approved, preliminary announcement is made that negotiations are contemplated. No specific commodities are mentioned at this time. The preliminary announcement is for the purpose of allowing interested parties to communicate their views on the proposed trade agreement in general to another committee, the Committee for Reciprocity Information. Like the Trade Agreements Committee, this group includes representatives from the Tariff Commission and all the Governmental departments concerned with foreign trade. It is their duty to receive information from the public, to digest it, and submit it to the Trade Agreements Committee.

Announce Intention to Negotiate

If by this time the proposed agreement still seems feasible, formal announcement is made of intention to negotiate and the tentative list of articles on which the granting of concessions is being considered is published. Inclusion of a commodity on the list does not mean that concessions will actually be given affecting it. Nevertheless, the listing of an article indicates that it has already had mature consideration and has been tentatively approved by the Trade Agreements Committee and its various affiliates. Any party who seeks to prevent a listed item being the subject of negotiations has more than a casual task on his hands, particularly if there is pressure on that commodity from the foreign country's negotiators.

When the list is published, dates are set for the filing of briefs and for oral hearings before the Committee on Reciprocity Information. The briefs are held confidential, but the hearings are public. In this connection it must not be forgotten that the Committee receives a good deal of testimony favorable to concessions by parties seeking the benefits of export trade. After the Committee reports to the Trade Agreements Committee, the latter, after consideration, submits its completed findings to the Secretary of State. The Secretary then forwards the documents to the President. If either of these officials wishes to make changes, his suggestions are referred back to the Trade Agreements Committee. The lists are then placed in the hands of State Department negotiators who proceed to trade concessions with representatives of the foreign country. After negotiations are completed, approval of the President and of the foreign government must be secured before the compact becomes effective.

The negotiatory process has many aspects of horse trading, and it is well to bear in mind that the fate of the commodity in which you are interested depends just as much on the foreign representatives as on our own. To complete an agreement may take a year or more. The suspense involved is difficult to bear, but it would be unwise for those who oppose reductions to protest on these grounds as long as delay reflects cautiousness on the part of those responsible. After an agreement is completed you have no recourse or appeal from its terms.

Agreements Now in Force

At the present time agreements have been concluded with 18 countries. In chronological order these are: Cuba, Belgium, Haiti, Sweden, Brazil, Canada, Netherlands and colonies, Switzerland, Honduras, Colombia, Guatemala, France and colonies, Nicaragua, Finland, Costa Rica, El Salvador, Ecuador and Czechoslovakia. In 1937 trade with these countries constituted 40 percent of our total. In these agreements the mining industry has been relatively little affected. Concessions on our part of direct interest to metal mining have been granted on manganese, platinum, ferromanganese, ferrotitanium, ferrosilicon, ferrovanadium, ferrouranium, lithopone, certain lead pigments and aluminum foil. Concessions have been obtained from individual countries on a number of metallic products, particularly of iron and steel.

In addition to the completed agreements, negotiations are now in progress with the United Kingdom and British Colonial Empire, Turkey and Venezuela. Also the Canadian pact has been opened for reconsideration because of the necessity of compensating Canada for permitting us to partake of the preferential status Canada enjoys in British trade under the Ottawa Agreements.

British and Canadian Pacts First Serious Threat to Mining

In the Turkish treaty a concession in chromite is under consideration. However, it is in the British and Canadian agreements that the mining industry faces its first serious threat to the protection now accorded major products. In the tentative list published January 7, 1938, with formal announcement of the intention to negotiate a British agreement the following products directly affecting metal mining appear: lead pigments, zinc oxide, low phosphorus pig iron, tungsten, chromium metal, steel ingots, tin plate, various iron and steel products, and aluminum. Manganese also appears, but cannot be cut any further, as it has already been given the maximum permissible reduction of 50 percent. In the supplementary list, published January 24, lead ores and mattes are included. In the Canadian list, issued January 28, are ferromanganese, ferrosilicon, ferrochrome, ferrotitanium, ferrovandium, ferrouranium, spiegeleisen, cadmium, nickel, lead and lead ores, zinc and zinc ores, and various iron and steel articles. The first six of these items have already been affected by the existent Canadian agreement, but not to the maximum permissible extent. The major products referred to as seriously threatened are lead and zinc.

The dates set for filing of briefs were in February and March, and hearings were held in March and April. Since that time those of us who are vitally interested have been in doubt as to our fate. No official statements have been issued. However, it is generally understood that there has been considerable difficulty in coming to terms with the British, partly because of a change for the worse in British economic conditions during the course of negotiations, and partly because of the obstinacy of the British emissaries in seeking to drive a hard bargain. Apparently they presumed that the great desire of our State Department to conclude an agreement with our biggest customer would induce us to accept disadvantageous terms. During the summer it was rumored that negotiations were on the verge of abandonment, but if this was true the differences were patched up, and it is now reported that the agreement is practically consummated.

Because the Canadian pact is so intimately connected with the British agreement that the negotiations are practically tripartite, it may be expected that only a short time will be necessary to fix its terms. Presumably the Canadian concessions consist principally of what they allowed the British to yield, and therefore the revisions of the present Canadian agreement will

be mainly devoted to compensatory concessions on our part.

Decision on Lead and Zinc a Fair Test for All Mining

Probably the treatment accorded lead and zinc under the forthcoming British and Canadian treaties will be an excellent criterion by which metal mining in general can appraise the fate in store for it under the reciprocal trade program. It is difficult to think of any important arguments that might be used in defense of any metal that were not used and thoroughly applicable to lead and zinc. The protection enjoyed by these metals is very moderate; nevertheless, by virtue of it our domestic self-sufficiency has been maintained, and without forcing consumers to pay exorbitant prices. The fall in prices that would unquestionably result from a tariff reduction cannot be expected to increase consumption to any important extent as, in general, their cost is an unimportant segment of the price the consumer pays for finished articles containing them, or they fulfill such particular needs that small changes in price do not affect demand.

Because the ores we mine are only half as rich as those from foreign sources, we employ more labor per ton. Our wage levels are higher. Therefore, a tariff decrease would drive an important portion of our producers out of business with consequent losses to them and dislocation of employment.

The miner is a difficult person to rehabilitate if he cannot live at his trade. Our mineral reserves constitute a "one-crop farm" whose productivity will be relatively poor if the harvest takes place under adverse conditions.

Finally, these metals are both of critical importance in wartime, and the maintenance of self-sufficiency is of considerable value from the standpoint of national defense. As stated by Dr. J. W. Finch, Director of the Bureau of Mines, the circumstance that Canada and Mexico both possess important reserves of lead and zinc and are unlikely to be involved together in war against us does not insure us against being forced to pay fancy prices in an emergency.

Because these facts seem compelling, we feel hopeful that the lead and zinc schedules will be left intact.

Up to the present the most important metal to be seriously affected by reciprocal trade concessions is manganese. The duty on manganese was lowered 50 percent in the Brazilian agreement, effective January 1, 1936. At that time the duty amounted to about half the prevailing domestic price, so the drop in price was approximately 25 percent. The hardships to domestic producers that would otherwise have occurred were obscured by a rising market due to general business improvement. By the spring of 1937 the price was higher than before the tariff reduction. Since 1937 the price has dropped because of general sluggishness of business. Nevertheless, there can be little doubt that since the Brazilian agreement the domestic price of manganese has consistently been lower than it would otherwise have been by an amount equal to the duty reduction. Feeling within the mining industry has naturally been divided on this issue, because virtually all the manganese output is consumed in steel.

Tariff a Watchdog Over American Living Standard

Most of us who are employed in the production of raw materials see the tariff as a watchdog over the American standard of living. We realize that this standard depends fundamentally upon our rich natural wealth and upon the energy and creativeness of our people, but believe that tariff protection is essential if we are to be successful in retaining the benefits primarily for ourselves. Within our own industries we can definitely perceive loss and unemployment in the wake of tariff reductions.

If these are true facts, why then do

Life of the Tri-State district is at stake in present trade negotiations

Mr. Hull and other advocates of reciprocal trade seek to reduce these safeguards? It would be unfair to allege that they are any less vitally concerned over the welfare of our own citizens than we are. Unquestionably they believe that we cannot have domestic prosperity without a substantial foreign trade. They see tariffs as barriers to the acquisition of essential materials by various nations and thus as primary causes of the international friction and unrest which lead to war. In their opinions the protective value of tariff to the people at large is approximately cancelled by the curbing of consumer purchasing power. To them the living standard is essentially independent of tariffs, witness the wide variations within this Country, where no interstate tariffs exist.

Solution Believed Through Trial and Error

I do not propose to undertake the thankless task of reconciling these two schools of thought, having neither the necessary time nor sufficient wisdom. Besides, I think it is plain that the solution will not be attained by logical processes, but by plodding trial and error. The problem is tremendously important and extremely complicated. Moreover, the progress toward that solution, whatever its direction, should properly be slow if loss and hardship are to be avoided.

In defense of their policy the advocates of reciprocal trade point out the increase in foreign trade under the trade agreement program. They cite that our export trade to agreement countries has increased substantially faster than to non-agreement countries. Also, that our total trade with agreement countries has grown more rapidly than that with non-agreement countries. Taking 1936-37 as an agreement period and 1934-35 as a pre-agreement period, in 1936-37 our export trade with agreement countries increased 42 percent over 1934-35 while that with non-agreement countries increased only 26 percent. Total trade with agreement countries increased 44 percent while that with non-agreement countries increased 37 percent. Because of the numerous factors involved it is impossible to state how much of the increase in our total foreign trade was due to the agreements in force.

Effects on Trade With Non-Agreement Countries

It is of course an entirely expectable result that our foreign trade should increase under the reciprocal trade policy, particularly trade with the agreements countries. However, from the point of view of producers of raw materials, a basic defect in the policy is that in return for concession to one country we yield concessions to virtually all countries. Naturally, in each agreement we must expect to concede to the nation involved approximately as much as we secure in return. As a result, the concessions we grant greatly exceed in total value those we obtain. For example, the reduction on manganese ore was made in the agreement with Brazil, which supplies about one-tenth of the manganese we consume. Obviously, Brazil did not compensate us for more than its share in this concession. If at some future date we undertake an agreement with one of the other important manganese ore producing countries, they cannot be expected to pay at that time for a concession they are already receiving gratis.

Under such a system it seems logical to expect a quickening in our imports from non-agreement countries as compared with exports to them. Statistics seem to bear this out. In 1936-37 our imports from non-agreement countries increased 51 percent while exports increased only 26 percent. Undoubtedly other factors contributed to this result, such as the demands of our expanding industrial activity for more foreign raw materials and the domestic crop shortage of 1936. Therefore it is impossible to state to what extent the trade agreements are responsible. Comparing 1937 to 1936 this condition showed a tendency to level off, as both imports and exports with non-agreement countries increased 34 percent. The future course of this comparison as well as of our general trade balance will be of considerable interest to the mining industry.

As noted previously, the time has not yet arrived when we can properly evaluate the effects of reciprocal trade on the metal mining industry. Up to now certain branches have been adversely affected and certain others have been helped. Also, more experience will be necessary before we can adequately measure the apparent tendency to enhance imports as compared to exports.

Power in Hands of Small Group—With No Appeal

Another source of concern lies in the circumstance that our fate is placed in the hands of a small group of officials against whose acts we have no appeal. They exercise a power which the Constitution for good reasons plainly assigns to Congress. They conclude treaties without the Senate ratification that the Constitution demands in such cases. In fairness, it must be admitted that by delegating the Congressional function to a group of non-partisan experts some gain in efficiency is possible. Up to the present time this bureaucratic form of administration has worked in optimum fashion. One cannot come in contact with the officials who now handle trade agreements without feeling respect for their painstaking care and sincerity. These qualities are not there by chance, but reflect the sterling character of the Secretary of State, under whose supervision this work is carried out. But we cannot always expect secretaries of the caliber of Mr. Hull or assistants of such desirable integrity. For this reason, it would seem appropriate as a democratic safeguard, that trade agreements should be subject to the same Senate approval that is required for other treaties.

Industrial Peace Association Formed

Leading citizens in the Pittsburgh district have organized the National Association for the Promotion of Industrial Peace, and have drafted W. C. MacQuown, president, MacQuown Fuel Company, the Coal Information Bureau, and National Coal Publications, to serve as executive director effective immediately. Purpose of the organization is to study the causes of industrial strife, and to endeavor, by organization and education, to bring about industrial peace. It is expected that the movement, which is receiving universal support and rapidly spreading, will be operated on a national basis in the near future. Mr. MacQuown suggests that anyone interested in "Industrial Peace" should write him for full details.

WHEELS of Government

● *As Viewed by A. W. Dickinson of the American Mining Congress*

AS TIME moves nearer to the November elections, there is more of an atmosphere of conservatism in evidence. This is noted particularly in the West and the South, but even in the industrial North there seems to be something of a sobering influence in the minds of the voters.

The defeat of Senator McAdoo in the California primaries through the use of a "$30 every Thursday" campaign slogan served not only to shock the citizens of the Pacific coast, but also to arouse concern and resentment against "crackpot" leadership throughout the Nation. California now expects the election of a Republican to the United States Senate as well as to return the Republican Governor to office. In Utah it is said to be an even chance that the Republican nominee running against Democratic Senator Elbert Thomas will win. In Idaho, it is reported that there will be a neck-and-neck election in the choice between the Democratic Senatorial candidate D. Worth Clark and former Idaho State Senator Donald A. Callahan. The Idaho race is particularly interesting in that former Representative D. Worth Clark defeated Senator James P. Pope by declaring for the Townsend Plan. While generally known as a conservative, Representative Clark thus threw himself open to the reproach which is rapidly forming in the minds of the voters against such wild and impossible schemes. This gives able and eloquent Republican candidate Callahan the chance to employ the campaign weapons which he is so particularly fitted to use, and makes it possible for him to contest the election with his personal friend, Representative Clark, on the high, clean plane which he would prefer.

Taxation

While talk of preparation for the inevitable Revenue Bill of 1939 is pushed somewhat into the background by the excitement over the fall elections, the apparent intent of the Administration to press forward with a heavy military, aircraft and naval construction program has brought forth discussion of the sources of revenue which must be made available if such a program becomes a reality. Well does the Administration know that the normal sources of revenue are now pressed to the limit unless the indicated revival of business activity increases the flow of money to the Treasury coffers. It is true that in the taxation of individuals the exemptions could be reduced and the rates increased, a procedure which has been long advocated by Representative David J. Lewis of Maryland and Senator Robert M. La Follette of Wisconsin; so, also, could the manufacturers' excise tax be imposed, but this field has been so largely entered upon by the states that it is not likely of enactment in the Revenue Bill of 1939. One method which has been suggested to procure money for armament expenditures is to add a "super surtax" of perhaps as much as 10 percent to the normal taxes paid by corporations and individuals. This method has been used in Great Britain and would be set forth as an emergency measure which could, perhaps, be dropped after the necessity for it had passed.

Wage-Hour

As it became effective on October 24, the "Fair Labor Standards Act of 1938," in the main a statutory measure, is still very much a cloud of uncertainty to those charged with responsibilty of management in industrial enterprise. A most important point is the warning by Administrator Elmer Andrews that employers are subject to legal actions which may be brought by employes for the recovery of wages alleged to have been unpaid in violation of the law's provisions.

Addressing the Metal Mining Convention of the American Mining Congress at Los Angeles on October 27, Wesley O. Ash, Administrator for the Pacific coast region, stated that they were calling on employes to be tolerant for the time and to give industry and the administration opportunity to clarify the situation which will be done as soon as possible; that in the meantime they are not going to do any cracking down—there is no horde of "prohibition agents" about to be turned loose. Tolerance is what is wanted now.

Mr. Ash further said, "By express definition, an employe is deemed to have been engaged in the production of goods (for interstate commerce), if such employe was employed in producing, manufacturing, mining, handling, transporting, or in any other manner working on such goods, or in any process or occupation necessary to the production thereof, in any state.

"The statute confers benefits on pump men, hoist men, maintenance and repair men, clerks and bookkeepers. Such men are clearly engaged in processes or occupations 'necessary to the production' of goods for interstate commerce.

"What about individuals in 'bona fide' executive, administrative and professional capacities who are specifically exempted from the Act? The definition of these terms was left to the Administrator. According to regulations issued last Wednesday any employe who has managerial and discretionary authority, including the hiring and discharging of personnel and who is compensated in excess of thirty dollars a week is considered to be an executive. A professional is a person whose work is intellectual, varied, non-standardized and discretionary, and based upon real study in a definite field of knowledge as distinguished from a general education.

"Frequently sales corporations take over the product of mining companies. Is the branch force of the sales corporation covered by the Act? Yes, because it is engaged in interstate commerce. Note, however, that outside salesmen are exempted by the Act.

"I know that there are many small mines selling products in crude form to processing plants located in the same state. The employes of these mines are included in the program. Remember that employment in interstate commerce or *in* the production of goods for interstate commerce is the basis for application. Then, what is meant by the term, 'goods'? The Act defines 'goods' as: 'wares, products, commodities, merchandise, or articles or subjects of commerce of any character, or any part or ingredient thereof. . . .' The output of the mine, no matter how crude the form, is clearly an ingredient of the product which goes into interstate commerce."

In connection with the Idaho-Maryland Mines Corporation case in which the Federal District Court in California ruled that the company is not engaged in interstate commerce and hence not subject to the National Labor Relations Act, it is of interest to note that the National Labor Relations Board did not file petition for appeal to the Supreme Court on October 17, the limiting date. Thus the status of gold mining in California is pretty well determined. A comprehensive address on "To What Extent is Mining Involved in Interstate Commerce" was given by Judge Edgar Zook, counsel for the Idaho-Maryland Mines Corporation at the recent Metal Mining Convention of the American Mining Congress in Los Angeles.

Monopoly

The O'Mahoney Temporary Economic Committee, investigating business methods and procedure, is expected to open hearings on the glass industry early in November. The oil industry, in its production, refining, transportation, marketing, and retailing phases, is now under investigation by Assistant Attorney General Thurman Arnold, and will also be subject to hearings. The matter of divorcing pipe line companies from producing companies, which has long been advocated by Senator William E. Borah of Idaho in bills which he has in the past introduced for this purpose, is expected to come in for intensive inquiry in the hearings. It is reported that many officers of the oil companies will be called upon by the O'Mahoney committee to appear and testify in the hearings.

It is quite significant that a great many leaders of industrial enterprises are gladly and freely conferring with administration representatives and with the members and staff of the O'Mahoney committee. This gives more assurance that in its broad aspects the work of the Temporary Economic Committee may be careful and constructive and may, to some extent, put a stop to much of the foolish talk which has persisted in recent years concerning the conduct of *natural* resource enterprises. So many unfounded statements have been made that the remarkable work in research and in volume production, which has placed this country far in advance of all nations, has been beclouded and is certainly not fully appreciated. Now with the outcry for an adequate national defense, should surely come an appreciation of the necessity for these things which our farsighted industrial leaders have been quietly accomplishing.

Social Security

The advocacy of unwise pension schemes, which is playing so important a part in the congressional elections this year, has stimulated action in Washington. Chairman Doughton of the Committee on Ways and Means of the House has announced that amendments to the Social Security Act will be considered by his committee soon after the convening of Congress in January, and similar action is contemplated by Senator Pat Harrison's Committee on Finance. The amendments originating in the Social Security Board, in consultation with its advisory council, contemplate beginning the old age pension payments in 1940 instead of on January 1, 1942, as now set forth in the Act. Also planned is the coverage of farm laborers, domestic servants, Federal Reserve System bank employes, American seamen and employes of charitable institutions. The Board is expected to recommend increasing the minimum old age pensions so that those who retire during the early years of the program will receive more money. The present provisions for benefits of from $10 to $85 per month would be changed to provide $30 and upwards, even though a recipient's payments into the fund were not sufficient, under the terms of the existing Act, to entitle him to such benefits. Other amendments to the law would simplify administrative procedure with particular reference to unemployment compensation.

Aluminum grill window with seal, Department of Justice

—Horydczak

Micco Mine

(*Continued from page 25*)

nection with rock handling and long tramming of the small loading machine contributed to the adverse results.

The small loaders have since been used to load into conveyors, but here again the proportion of large coal was reduced and at present only hand loading onto conveyors is practiced. Three conveyor sections are now being worked on a multiple-shift system. Two of these set-ups are being used for heading development and the third for room work in a small panel which had been developed by hand during the time prior to the rehabilitation of the mine.

The belt conveyor was furnished by the Joy Mfg. Co.; and the chain conveyors for rooms and faces were purchased from the Joy, Jeffrey and Goodman Manufacturing Companies.

The mine projection provides for a multiple heading system for both the main and cross entries, so as to minimize resistance to the flow of air and accommodate track lay-outs for serving the loading points at each set of room headings without congesting the haulageway. Careful studv indicated that such a lay-out in coal of this height also eliminates the use of doors in controlling the ventilating current at the loading points, so as to serve the room entries and at the same time greatly reduce the power consumption of the mine fan.

Conveyor Development and Operation

In developing the mine, cross headings are to be driven approximately 4,000 ft. apart at right angles to the main headings. One heading of each group must, of course, be brushed for proper haulage clearances as well as some additional brushing at the belt loading points. The cross headings are so arranged that room headings can be driven, both to the right and left, a distance equivalent to the length of the mother belt, which eliminates quite a lot of heading development work and consequently the expense of additional top brushing.

Cross headings are being developed progressively by the use of chain flight conveyors, and the loading point moved ahead every 300 ft. In driving a six-entry system, the haulway and the two adjacent headings are driven up first, and the direction of loading changed around so that top brushing and the necessary track extensions can be made in the haulageway while the other three headings are being advanced.

Pairs of room headings will be turned on 600-ft. centers from the cross headings, which provides for a room depth of 300 ft. on each side of the belt. The mother belt is assigned to the outby heading of each room heading set-up; both the heading and air course are to be driven abreast with chain flight conveyors ahead of the belt. When the room headings are developed to the full extent of the belt, three rooms 35 ft. wide will be driven on each side of the heading on 45-ft. centers, leaving a 10-ft. pillar between rooms.

A typical crew for operating a two-place set-up, as in the development of room headings, consists of four face men, one loading point operator, one part-time boss, and the occasional assistance of the mine electrical force. On the 35-ft. room faces three men are used shoveling into a face conveyor.

Face Preparatory Work

All places are undercut with short-wall machines having 7½-ft. cutter bars and cutting a 5½-in. kerf. Thin kerf bars have been given some thought, but are not considered as being applicable to this coal due to insufficient space for expansion of the coal when shot. Borod tipped bits are used exclusively, and have proven to be very satisfactory. All machine cables are equipped with permanent connectors for attaching to power feed lines, with connector plugs at the machine for plugging in the electric coal drill.

Drilling is done by hand-held electric drills using regular "Cardox" augers with renewable diamond point bits. These augers cut a 2½-in.-diameter hole to accommodate a 2-in. shell. One drill hole is required for each 8½ ft. of face width in wide places and approximately 7 ft. in narrower places.

Early recognition of the fact that coal shot with powder did not yield a very large percentage of coarse coal, the resultant delays due to smoke, and the increasing demand for lump, lead to the adoption of "Cardox" as the standard blasting material. Through its use, and with the aid of close supervision over face preparation, the present yield of block coal comprises from 30 to 35 percent of the production.

The Micco mine is not yet "out of the woods," but everyone connected with it is most hopeful for its future. The project involves no new engineering or operating principles, as the reader has no doubt perceived. The really interesting thing is that a mining community of 750 people has been kept from becoming a ghost town and can look forward to another decade or so of fair prosperity.

Demand Diversity in Several Points of Power Service

(*Continued from page 32*)

tor, and the bill is controlled by the demand created in the billing period. In some schedules the demand change is made up separately, but in others it is woven into the rate in such a way that lowered demand places more kilowatt hours in the lower priced blocks or brackets of the schedule.

Another advantage of one point metering is that when all kilowatt hours are billed on one bill, it is generally true that a larger percentage of the kilowatt hour consumption is computed in the lower brackets of the rate. The only exceptions, of course, would be a flat rate for all kilowatt hours consumed, or a load factor such that the consumption could never reach the lower brackets.

In conclusion, preliminary studies should be made by the consuming company before power lines are built to secure the advantages of diversification of demands by one point metering. Diversity in demands does not always exist and, of course, varies from month to month because of the chance or accidental elements involved. Again, line losses and voltage drop on consumer's lines must be balanced against diversity savings and line maintenance costs considered.

When a power consumer spends money on power line construction to obtain the diversity in billing demands he feels he will receive, the consumer is merely betting that the highest demands at all his service points will not occur simultaneously. There may be months when he loses his bet, and no doubt some months will show a saving. The consistent saving by one point metering is rarely as great as is generally believed, and the need for long range tests in every case is indicated.

Annual Dinner. Inset (left to right): Senator Key Pittman, of Nevada; Robert Linton, Chairman, General Committee on Arrangements; Harvey S. Mudd, Toastmaster; Cornelius F. Kelley, Guest Speaker; Howard I. Young, President, American Mining Congress; T. H. O'Brien, National Chairman, Program Committee; Judge John W. Haussermann; and Dr. John W. Finch

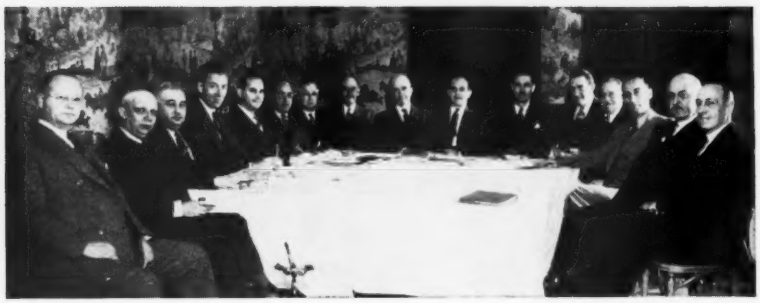
SMASH HIT SCORED at LOS ANGELES

● *Fifth Annual Metal Mining Convention and Exposition, Just Concluded, Breaks All Previous Attendance Records*

METAL mining men the country over will not soon forget the record-smashing success of the Fifth Annual Metal Mining Convention and Exposition of the American Mining Congress, Western Division, convened in the Ambassador Hotel, Los Angeles, Calif., October 24-27. Attendance at these meetings, held at points successively farther west during the past four years—Chicago, Denver, Salt Lake City, and finally Los Angeles—has grown by leaps and bounds, until the total number participating this year reached the startling figure of 2,220, including 1,513 operators, 419 manufacturers and 288 ladies.

Recital of this record is a striking reflection of the remarkable growth in interest manifested by the entire metal mining fraternity in these meetings, where vital issues facing the industry—operating, economic, tax, financial, labor, legal and public relations—are presented by recognized leaders and discussed in open forum. This year's program, arranged under the direction of a committee headed by Thos. H. O'Brien, vice president, Inspiration Consolidated Copper Company, was a complete fulfillment of predictions that even the successes of the past would be eclipsed by the array of authoritative talent assembled in the eight sessions comprising the four-day program. And the entire meeting served to bear out in glowing relief the prophetic words of Robert Linton, well-known mining engineer of Los Angeles and chairman of the General Arrangements Committee, that "This meeting, like others in the past— . . . will undoubtedly serve in an important way to unify the mining industry in its approach to the solution of nation-wide problems of mutual concern. . . . " and that it will be one that "no one who is active in metal mining should miss." If you are one of the unfortunates who were unable to get there, just talk it over with Tom, Dick or Harry, or any of the 1,500 operating men who were lucky enough to make the trip, and then resolve to get to the meeting to be held a year hence!

Visitors leaving at the end of the week were most enthusiastic over the program and arrangements, and all those contributing to the success of the undertaking are to be warmly commended and thanked for their untiring efforts. In addition to Messrs. O'Brien and Linton, mentioned above, those particularly worthy of mention include: Howard I. Young, president of the American Mining Congress; Stanly A. Easton, chairman of the Board of Governors, Western Division; Wm. C. Browning, chairman of the Finance Committee; Yale D. Hills and H. L. Morrison, co-chairmen of the Exhibits Committee; M. J. Holmes, chairman of the Annual Dinner Committee; G. A. Joslin, chairman of the Hotels Committee; H. W. Howe, chairman of the Entertainment Committee; E. O. Slater, chairman of the Excursions Committee; and Julian Boyd, chairman of the Reception Committee. The hundreds who worked untiringly with them as committee members share these honors.



Executive officials of Western mining organizations discussing plans for the convention

Collaborating with the men, and perfecting and carrying out the fine program of special entertainment for the hundreds of ladies at the convention were various committees of Los Angeles women headed by the following: Mrs. Harvey S. Mudd and Mrs. Edwin K. Chase, chairman and vice chairman, respectively, of the General Committee; Mrs. Otto Wartenweiler, chairman of the Registration and Information Committee; Mrs. Robert R. Boyd, chairman of the Transportation Committee; and Mrs. Robert Linton, chairman of the Reception Committee.

THE PROGRAM

Western Mining Problems

The convention was opened officially at 10:30 Monday morning by Julian D. Conover, secretary of the American Mining Congress, who expressed gratification at the opportunity afforded of gathering together in Los Angeles to discuss vital problems confronting mining today—tax, labor, stream pollution, operating, health and safety, etc.—which, "owing to the special characteristics of mining, are perhaps more complicated and difficult of solution than in the case of many other industries." In urging thorough discussion of program subjects following each paper, he declared, "The purpose of this whole convention is to develop the best thought of the industry, and we want every mining man to throw his own ideas into the hopper. This will be a real help to other members of the industry and to the American Mining Congress in its efforts to serve you."

He then introduced Chas. H. Segerstrom, president of Nevada Massachusetts Co., as presiding officer of the first session.

The first paper, keynoting one of the themes elaborated upon during ensuing meetings in the course of the week, was "The Right to Mine—Its Protection Against Encroachment," by Robert M. Searls, counsel, Newmont Mining Corporation. After tracing the various types of taxes imposed upon mine operators, he emphasized the constantly expanding exercise of police power both by the state and federal government as a qualification to the right to mine, stating that, "the right of American citizens to mine must not cease to exist. It should and must continue in the future, as it has in the past, as one of the most important factors in meeting the material demands of our modern civilization." In conclusion, he urged the mining industry to forget some of its individualism—"to cease to be an industry of separate units merely because most of its members are geographically widely separated," and to "speak to and act toward the administrators of a democratic government so vigorously that law makers and administrative tribunals alike will recognize the justice of its contentions."

CHAS. H. SEGERSTROM
Chairman of the Session on Western Mining Problems

"Our Public Land Policy" was the subject next presented by Victer J. Hayek, attorney at law of Los Angeles, who warned that while the mining industry does not challenge the right of the Government to withdraw certain parts of the public domain from mineral entry and location, the industry does object to the manner in which these withdrawals are made. With reference to the question of conservation of our mineral wealth, he declared, "Vague, illusory, and categorical statements to the effect that we must conserve our mineral wealth against inimical depletion are misleading. Give the prospector and miner the right to continue his search on our public domain and he will more than offset the extraction of minerals from our lands by the discovery of new deposits. These are facts that are substantiated by the record of the progress of our mining industry."

Robert S. Palmer, secretary of the Colorado Chapter of the American Mining Congress, followed with an address on "Coordination of State and Federal Aid to Mining," declaring that while various examples of successful coordination have been effected, the general concensus of western mining men seems to be that the Federal Government in particular has not within the past few years given any special aid to the mining industry. Quoting from a recent report forwarded to certain Government officials, he said, in support of Federal aid to mining, "The returns from mining properties intelligently developed are just as certain, and oft-times more certain than the returns from agriculture and manufacturing."

Mining and the S.E.C.

The session on Monday afternoon was devoted entirely to a discussion of the problems relating to financing

SAMUEL H. DOLBEAR
Chairman of the Session on Mining and the S.E.C.

of mining development and operation under the severe regulations imposed by the Securities and Exchange Commission, with Samuel H. Dolbear, of Wright & Dolbear, New York, consulting engineers, presiding.

Mr. Dolbear opened the session by presenting "A Study of Mine Security Registration and Recommendations for Improving Procedure," a report of the American Mining Congress Committee for Cooperation with the S. E. C., of which he is chairman. Intensive effort has been devoted to this work by Mr. Dolbear and his committee members, the findings of which represent a cross-section of opinions and experience of a large number of registrants. "It is the hope of the committee," he said, "that these findings, although inescapably critical, shall be considered constructive." Fourteen concise findings and recommendations were included, among which were statements that: present rules and regulations are unnecessarily complex and difficult of compliance; cost of registration is excessive; too much time in many cases is necessary to fulfill the requirements; extensive disclosure of information demanded appears to defeat its own object; there is urgent need of cooperative endeavor between Federal and state regulatory bodies to avoid duplication or conflicting requirements; the Commission has attempted to set up its own standards as to what constitutes sound engineering practice; and that a Division of Mining be established within the Commission, headed by a mining engineer of experience and recognized standing.

The viewpoint of the Securities and Exchange Commission was given by Baldwin B. Bane, director of the Registration Division of the S. E. C., and by Howard N. Lary, Regional Administrator of the Commission at Denver, Colo. Mr. Bane outlined procedural problems, and Mr. Lary stressed engineering aspects. The latter expressed disappointment over Mr. Dolbear's report, charging that lack of specific information in it precluded constructive action, and went on to defend actions of the Commission and to level uncomplimentary charges against the mining industry for past financing methods. Mr. Dolbear defended his report by citing numerous affective illustrations backing up the fifteen points touched upon, and clinched his arguments by quoting from a letter discussing the same points, sent him by a former chief mining engineer of the Commission.

Viewpoints of registrants, outlining in some detail their experiences with the S. E. C., were given by Harlan H. Bradt, president, Bralowe Corporation, and Paul Klopstock, chairman of the board, Austin Silver Mining Company.

New Developments in the Industry

The session on Tuesday morning, presided over by J. C. Kinnear, general manager of Nevada mines, Nevada Consolidated Copper Corporation, was given over to a consideration of operating problems and new developments in the metal mining industry.

Judge John W. Haussermann, president of Benguet Consolidated Mining Company and Balatoc Mining Company, the two largest gold operations in the Philippine Islands, spoke on "Mining Problems in the Philippines," in which he stressed aspects of operation, development and mining in the Islands which differ materially from those usually met in developing and operating properties in the United States. He outlined developments in the Baguio district, the most important gold bearing area in the Islands, and described in detail the formation and growth of the two important companies he heads. He likewise briefed the discovery and development of the Florannie and Masinloc chrome deposits—the latter reported to consist of about ten million tons of 33 percent chrome oxide ore, both properties being operated on a contract basis by his company. One of their chief problems, according to Judge Haussermann, has been the education of native personnel in mining. It takes at least a year or two before a man is reasonably familiar with underground work, and much longer to develop skilled mechanics. Also, he referred to effects on native labor of the philosophy of fatalism, so characteristic of Oriental races. Natives are, in general, mentally lazy and unmindful of danger—the same philosophy making them very much individualists, thus interfering with the practice of good team work so necessary to efficient operations. He estimated that the Islands will produce some 60,000,000 Philippine dollars in gold this year, and concluded with the declaration, "The industry has been developed entirely by American engineers and geologists, and the products of the industry have been sold entirely in this country. Let me tell you that you have in the Philippines a very healthy offspring that is a real credit to you."

J. C. KINNEAR
Chairman of the Session on New Developments in the Industry

"Metallurgy of the Coeur d'Alene Silver Ores" was the subject of a paper presented by W. Church Holmes, mill superintendent and metallurgist, Sunshine Mining Company. He outlined the different concentrating methods possible at the Sunshine, Polaris and Crescent mills, and then pointed out the economic and technical factors dictating the particular method followed at each of the plants.

Speaking on the subject "Improvements in Crushing and Grinding Practice," C. T. Oughtred, superintendent of concentration, Consolidated Mining & Smelting Company of Canada, Ltd., outlined highlights in the history of these practices, and went on to point out that classifiers are generally admitted to be the weakest link in the grinding chain, average efficiencies, according to his statement, being in the neighborhood of only 40 percent. He concluded by outlining in detail the experimental work done recently in the Sullivan concentrator at Kimberley, British Columbia, in the use of the Hadsell Hi-Speed mill in which grinding is effected by the ore itself rather than by such media as balls or rods. A unique control of vacuum in the mill discharge makes possible production of a remarkably uniform product, and the process holds considerable promise of bringing about important savings in power. "It may be a child of illegitimate ancestry, but it shows every promise of nosing itself into usefulness, particularly in the field of small capacity plants," Oughtred said.

The paper on "Slusher Loading in Driving Inclines" by Harley A. Coy, mining superintendent of the American Zinc Company of Tennessee, was not read due to lack of time and the

absence of Mr. Coy, but mimeographed copies were available. He described development of a unique method of scraper loading used at the company's Mascot Mine No. 2, whereby important savings were effected. Average loading costs from this incline by use of the drag ramp were $2.54 per foot, compared with loading costs of $4.10 per foot by hand methods.

Legal, Tariff and Public Relations Problems

With Robert M. Searls presiding, the afternoon session on Tuesday was devoted to discussion of problems relating to legal, tariff, and public relations aspects of the mining industry.

Judge Edgar T. Zook, counsel of the Idaho Maryland Mines Corporation, spoke on the subject "To What

ROBERT M. SEARLS
Chairman of the Session on Legal, Tariff and Public Relations Problems

Extent is Mining Involved in Interstate Commerce," confining his discussion to the relation of the mining industry to the National Labor Relations Act and other related legislation on the interstate commerce clause of most vital concern to all industries today. After outlining important decisions relating to the former Act, he concluded that, "From the leading cases referred to, one must assume that the following mining activities are definitely involved in interstate commerce to the extent of being subject to the jurisdiction of the National Labor Board: (1) The coal, iron and other mines and quarries of the great nation-wide producers of steel, aluminum, lead and zinc products; (2) Any mines or quarries which are operated by companies which themselves market or ship any substantial portion of their products in interstate commerce." He ventured the opinion that small mines selling and delivering their products to local smelters and refiners have only a remote, and, in many cases, insubstantial connection with interstate commerce, and should therefore not passively accept any claim or jurisdiction by the Board.

Speaking on the subject "Application of Reciprocal Trade to Mining," Evan Just, secretary of the Tri-State Zinc & Lead Ore Producers Association, outlined procedural methods followed by the State Department, and went on to point out that "Probably the treatment accorded lead and zinc under the forthcoming British and Canadian treaties will be an excellent criterion by which metal mining in general can appraise the fate in store for it under the reciprocal trade program."

Congressman James G. Scrugham of Nevada addressed the delegates on the subject "The Mining Industry and National Defense." He outlined the importance of strategic and critical minerals in an adequate national defense program, and stressed the need of surveying and developing supplies of those metals and minerals of strategic importance in which the United States is deficient.

The urgent necessity of placing simply and squarely before the public the vital stake it has in the well-being of the mining industry, was outlined by Thomas E. Campbell, executive vice president, Mining Exhibits, Inc. He pointed out their mammoth exhibit plans for the forthcoming World's Fair in San Francisco, and extended a cordial invitation to the delegates to attend.

Health and Safety

The Wednesday morning session was devoted to consideration of health and safety aspects of mining, with William J. Coulter, western manager, Climax Molybdenum Company, presiding.

A paper on "Health Conservation of the Metal Miner" by William B. Daly, general manager, Anaconda Copper Mining Company, was read by George H. Rupp, manager of the Mining Department, Colorado Fuel and Iron Company. Mr. Daly stressed factors concerning silicosis as the one important occupational disease with which the metal mining industry is concerned, detailing the studies that have been made recently by committees formed following the February 26, 1938, conference called together by

WILLIAM J. COULTER
Chairman of Session on Health and Safety

the United States Department of Labor. He showed how, through use of improved ventilating methods, together with adequate water sprays and wet drilling, air dustiness at the Butte Mines of his company has been reduced to a point far below the concentration generally recognized as having any danger to the miner's health.

Experiences of the St. Louis Smelting and Refining Company in combating the silicosis "racket" were detailed by H. O. Smith, counsel of the company. Activities of a group of St. Louis ambulance-chasing lawyers were effectively quelled through the untiring efforts of the company's staff, led by James A. Caselton, vice president and secretary.

The "Accident Prevention Practice of Phelps Dodge Corporation," was described to delegates by H. C. Henrie, general superintendent of the Copper Queen Branch, Mines Division, Phelps Dodge Corporation. He pointed out that the previous experience of the Corporation had very definitely indicated that responsibility for effective accident prevention work rested primarily on the executive officers and management of the company, and that this group should devote a reasonable amount of time to safety work to improve the company's accident record; stressing, in this connection, the necessity of proper and impartial placing of responsibility for accidents, followed by disciplinary action for failure to comply with safety rules and construction.

Prospects for the Metals

With R. M. Hardy, president of the Sunshine Mining Company, in the

ROBT. M. HARDY

Chairman of the Session on Prospects for the Metals

chair, the Wednesday afternoon session was given over to a symposium on the present status and future outlook for the metals. These included: "Lead," by Stanly A. Easton, president, Bunker Hill & Sullivan Mining & Concentrating Company; "Zinc," by Howard I. Young, president of the American Zinc, Lead & Smelting Company; "Copper," by Kenneth C. Brownell, vice president, American Smelting & Refining Company (read in Mr. Brownell's unavoidable absence by W. J. O'Connor, manager of the American Smelting & Refining Company in Salt Lake City); "Iron Ore," by H. C. Jackson, Pickands Mather & Company; "Gold," by Herbert A. Sawin, economist, Yuba Consolidated Gold Fields; "Silver," by Walter Trent, mine operator and engineer of Los Angeles and Washington, D. C.; and "Other Metals and Industrial Minerals," by Dr. John W. Finch, director of the United States Bureau of Mines.

Senator Key Pittman, in addressing a capacity audience on the subject "Gold, Silver and International Exchange," made a stirring plea for the welfare of the silver mining industry, and urged fair and adequate consideration of its problems in Washington. He outlined his recent proposal that our Government accept one ounce of silver for ten pounds of American cotton, showing how this would react to the benefit of all parties concerned.

Taxation

The Thursday morning session, presided over by Henry B. Fernald, of Loomis, Suffern & Fernald, New York City, and chairman of the Executive Tax Committee, American Mining Congress, comprised a symposium on the subject of taxation.

"The Revenue Act of 1938, With Special Reference to Mining Problems" was analyzed by Granville S. Borden, tax counsel, San Francisco, Calif. After listing important changes in revenue laws included in the Revenue Act of 1938, Mr. Borden went on to outline a number of specific mining tax problems, including problems arising from the definition of "property," problems relating to depletion based on cost, problems relating to depletion based on percentage of income, and agreements for purchase and sale of mineral properties.

Ellsworth C. Alvord, counsel, American Mining Congress in Washington, D. C., discussed "Federal Fiscal Policies." After pointing out constantly recurring deficits of the Government, brought about primarily through unwise and wasteful expenditures, he recommended the following fiscal policies for the future: (1) Stop the annual tinkering and experimenting with our tax system; (2) enact a reasonably permanent tax system, to be enforced

HENRY B. FERNALD

Chairman of the Session on Taxation

for several years, based upon the principle of taxation for revenue only and the principle of maximum yield during the period it remains in effect; (3) place direct responsibility upon Congress for keeping future expenditures, including a sound program for orderly debt retirement, within the income produced by such a revenue system; (4) obtain increased revenues for further necessary expenses only through the adoption of sound fiscal and other policies which will encourage and stimulate private initiative and enterprise, constantly promote business activities and progress and expansion, provide opportunities for private employment for those now on Government relief rolls, and by these methods increase our national income, which is the true base of revenue yield.

Speaking on the subject "The Public's Interest in Mine Taxation," A. G. MacKenzie, secretary, Utah Chapter, American Mining Congress, told delegates that, "We have a well-conducted

(*Continued on page* 48)

Part of the large crowd that attended the session on labor problems, at which Senator Edward R. Burke, of Nebraska, delivered the principal address

A DECLARATION OF POLICY–

THE WESTERN DIVISION OF THE AMERICAN MINING CONGRESS assembled in annual convention at Los Angeles, Calif., October 27, 1938, herewith declares its views upon the following subjects of public policy:

RELATION OF GOVERNMENT AND BUSINESS

Confidence is the foundation of economic recovery and stability. Essential to confidence are balanced budgets; stable money; thoughtful, well-considered legislation confined to sound, general principles; impartial administration of the law, and encouragement of private enterprise and initiative.

Government should not engage in competition with private industry.

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EMPLOYE RELATIONS

The interests of the general public, of employes, employers, and of capital, are mutual and can be served best through the fullest measure of cooperation.

The National Labor Relations Act.—We recognize and accept the principle of collective bargaining. We regret that the application of the National Labor Relations Act has resulted in undeniable injustice to employes, employers and the public, and urge proper amendments to the Act and changes in methods of enforcement to insure its equitable application and administration.

Health and Safety.—We believe in the best possible working conditions for employes in the mining industry, and approve all reasonable and proper measures for promoting their health and safety. We recognize the good effect of adequate laws that will protect the employe from health hazards and the employer from unfair claims.

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TAXATION

Consistent with our belief of many years, we view with ever-increasing apprehension the continued unbalanced national budgets with mounting expenditures and progressive deficit financing made necessary thereby. Sound and proven theories of Government finance demand that the control of these expenditures MUST be returned to Congress. There alone, as the Constitution provides, responsibility for Government revenues can be united with responsibility for Government expenditures. Having properly resumed its constitutional powers in this respect, Congress, if it would preserve the Nation from the financial cataclysms which have enveloped so many countries, should and must limit Federal expenditures to an amount which can be covered by taxation yield.

The incontrovertible facts as to the national fiscal situation indicate the necessity for a revenue system which will yield substantial income to the Government over a considerable period of time. This necessity exists even though all possible desirable economies be made in national expenditures. We therefore advocate a system of taxation based upon the principle of maximum yield over a period of years, and we emphasize that this can be accomplished only through the adoption of policies which encourage and do not discourage, deter or destroy business initiative, enterprise and continued expansion. Only by continued business progress and expansion and increase in national business income arising therefrom can a base for adequate Government revenue be obtained.

We commend the Congress of the United States on its adoption of provisions in the Revenue Act of 1938 which greatly modify the penalty tax on the so-called undistributed profits of corporations, assure more equitable treatment of capital gains and losses, preserve the principle of reasonable depletion allowances, and permit periodical redeclaration of value for capital stock tax purposes. We believe that the Revenue Act of 1938 is encouraging and stimulating employment and business enterprise and thus will yield increased rather than decreased revenues to the Government. We urge the repeal of the remnant of the undistributed profits tax and the elimination of this and other needless complexities of the law.

The flat-rate tax upon corporate income should be reestablished; taxable income should be computed upon the basis of consolidated returns compulsory for affiliated corporations; the tax on dividends received by corporations should be removed; business losses of one year should be carried forward and deducted from future income; the deduction of capital losses should be allowed without limitation; taxable income should conform more nearly to true income computed in accordance with accepted accounting practices; and the capital stock tax should be repealed at the earliest possible date, and

until repealed an annual declaration of value should be granted. We are confident that these are all appropriate features of tax legislation designed to yield maximum revenues over a period of years because of the stimulus to business which would result from their adoption.

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TARIFF

We recognize the value of increased international trade if we are to continue to be a prosperous nation. We have grown great under a protective tariff system. In changing tariffs, by reciprocal trade agreements or otherwise, reductions should be made only when:

(1) They will not cripple any industry vital to national defense, in such a manner as to imperil the safety of our country.

(2) They will not dislocate any industry in such a manner as to increase unemployment of either labor or capital within that industry.

(3) The standard of living for those engaged in the industry affected will not be lowered.

Reciprocal trade agreements should not become effective until they have received the approval of the United States Senate.

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MONETARY POLICY

We favor the return of control of our monetary system to the Congress. We favor a currency with a metallic base as opposed to a so-called managed currency. We favor the use of both metals—gold and silver—in such monetary system, and we favor the continuation of purchases of newly mined domestic gold and silver as a means of providing and maintaining a metallic base for our currency.

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SECURITIES AND EXCHANGE COMMISSION

We endorse the report of our Committee on Cooperation with the Securities and Exchange Commission, dated October 24, 1938. We urge prompt adoption of the recommendations for simplification of the Securities and Exchange Commission regulations and administration, and the establishment, within the Commission, of a Division of Mining, headed by a mining engineer of experience and recognized standing, with authority over the issues of mining companies.

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WATER POLLUTION

We commend the action of Congress in rejecting amendments to the Barkley-Vinson Water Pollution Bill, which amendments would have vested regulatory control over water pollution in a Federal agency instead of leaving such control in the hands of state governments, to be supplemented by interstate compacts when necessary.

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PUBLIC LAND POLICY

We reaffirm our endorsement and approval of the historical and time-honored system of locating mining claims and granting of patents which has proved to be such a factor in the discovery and development of mineral resources. This system is thoroughly grounded both in practice and law, and for the future well-being of the national economy should be continued without change.

We deplore governmental prohibition of the development of valuable mineral areas in the national game preserves and needless restrictions to such development on other public lands.

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GOLD RESERVE ACT

We commend the activity of the Treasury Department under the Gold Reserve Act of 1934 in apprehending and convicting high-graders and breaking up their nefarious practices. We favor strengthening the terms of the Act so as to further facilitate such action.

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STRATEGIC MATERIALS

We recognize that the troubled state of the world today makes it necessary for our Government to lay plans to meet with success any national emergency.

Our defense plans must of necessity include provisions for an adequate supply of strategic and critical war materials.

As one of the essential industries in the furnishing of such materials, we pledge our cooperation in the development and execution of a program directed to that end. We ask Congress to make possible, under the direction of the Bureau of Mines, a search and discovery program for minerals in which our country is deficient.

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LEGISLATIVE PRINCIPLES

We urge careful, thorough and independent investigation and consideration by the legislative branch of the Government, not merely as to the objectives of proposed legislation but also as to means proposed for accomplishing such objectives.

The enactment of laws, admitted to be defective and designed to be made workable only after amendment, is unsound and detrimental to the country's prosperity and development, and to the people's confidence in their Government.

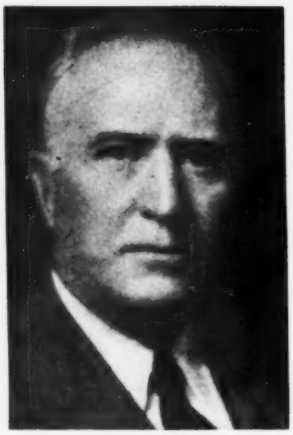
(*Continued from page 45*)

domestic industry which is a large employer of labor, a large consumer of the goods and services of others, a large taxpayer and a vital national asset. It should, as it does, bear its share of all public burdens and responsibilities, but they must not be allowed to remain excessive and those who impose them must recognize that the nature of mining makes it more sensitive and vulnerable than many other human activities. They should especially recognize that to overload this industry is not merely an injustice to it but a loss to the entire public. And the public should be shown that unless the mining industry can continue and continue on a profit basis with reasonable taxation, the public will lose money."

Labor

With D. D. Moffat, vice president, Utah Copper Company, presiding, the eighth session on Thursday afternoon was devoted to a discussion of labor problems which are of such vital concern to the mining industry today.

Speaking on the subject "Labor Relations at Home and Abroad," one to which he has devoted months of careful consideration and study, Senator Edward R. Burke, of Nebraska, stressed the need for present action to improve labor relations in this country, and recommended a system here similar to that which, he stated, applies in England—voluntary discussion and settlement of labor disputes by employers and employes. "We must find and remove the causes that produce a condition under which we have 10 to 12 million idle workers. Could that be done, the country would move forward rapidly into an era of general prosperity. Our task is to determine how best we may proceed to tear down the barrier that has been raised between those who contribute their labor and those who provide capital and the service of management."



D. D. MOFFAT

Chairman of the Session on Labor

Following Senator Burke's address a discussion of present-day personnel problems of industrial management was participated in by Milton W. Dobrzensky, attorney at law of Oakland, Calif., and Ralph W. Merritt, industrial relations counselor of Los Angeles.

Discussion of the application of the Wage-Hour law to mining was presented by Wesley O. Ash, San Francisco regional director of the Wage-Hour Division, United States Department of Labor, who outlined general matters of policies and procedure followed by those who are administering this important Act. Although Mr. Ash had previously been furnished with a digest of some twenty-five pressing questions involving the specific application of the Wage-Hour Act to the mining industry, he was not in a position to answer a majority of these questions, and it was pointed out that in many cases only the courts could give a definite decision.

Declaration of Policy

A Declaration of Policy, comprising a succinct statement of the views of the Western Division of the American Mining Congress on vitally important topics of public policy, was presented for Oscar N. Friendly, chairman of the Resolutions Committee, by Evan Just, committee secretary. The resolutions were adopted unanimously, and may be found in full on pages 46 and 47.

THE EXPOSITION

The exposition of mining and milling equipment and supplies was again one of the feature attractions of this annual meeting. Sixty-five leading manufacturers were represented with attractive displays which drew widespread interest from the hundreds of mining men present. The delegates took full advantage of the opportunity

Luncheon and welcome to delegates in Cocoanut Grove

THE JEFFREY MANUFACTURING CO.
ELECTRIC
ATLAS
ANACONDA
THE WESTERN WIRE COMPANY
ANACONDA
LINK BELT COMPANY
TAYLOR ENGINEERING & MANUFACTURING CO.
SOLD
INTERNATIONAL HARVESTER CO.
THE DORR COMPANY INC.
GARDNER DENVER
ROCK DRILL MFG. CO.
SMITH ENGINEERING WORKS
MINE SAFETY APPLIANCES CO.
SANDVIK STEEL INC.
CARBON
E.I. DU PONT DE NEMOURS & COMPANY
LOS ANGELES BY-PRODUCTS COMPANY
KEUFFEL & ESSER CO.
GARLINGHOUSE BROTHERS

afforded to study and inspect the varied machinery and equipment available for handling various phases of their operations.

The success of the exposition was attested by the enthusiastic comments of exhibitors regarding the valuable contacts made during the week, and manufacturers and operators thoroughly agreed that this occasion for informal discussions of industry's operating problems is mutually advantageous.

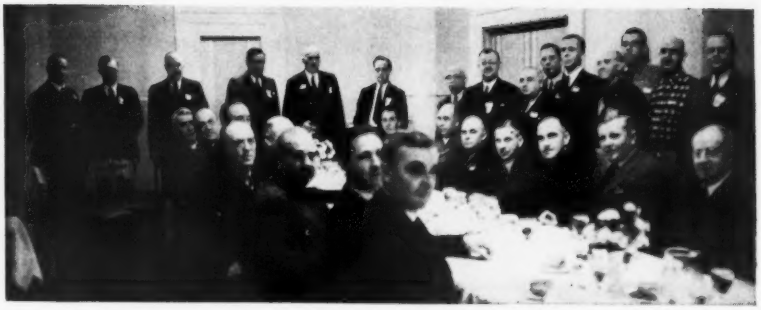
Large operating units, equipment and plant models, scene-in-action displays, motion pictures, oil paintings and photographic displays were all used to impress the visitors with the services which the manufacturers offer the industry.

The parade of equipment and supplies available for modern metal mine operation included crushing and grinding equipment, various types of classifiers and thickeners, pumping units, air compressors, hand and carriage mounted rock drills, miscellaneous pneumatic tools, portable drill carriages, balloon-tired wheel-barrows, excavators, loading shovels, draglines, diesel power units, wire rope, bore hole cable suspension units, electrical equipment and transmission cable, drafting materials, surveying and mapping instruments, explosives and blasting accessories, lubricants, storage batteries, haulage units, detachable drill bits, drill steel, conveying and screening equipment, steel belt conveyors and varied steel products. Safety was featured on every hand, particularly in the displays of safety equipment which offer every type of protective device and safety aids known to the industry.

The Mineral States Exhibits again attracted the attention of delegates to the development of the mining industry in our leading mining states. Their exhibits are always of great educational value, and serve properly to publicize the industry's advancement.

As a whole, the exhibits reflected the modern developments within the industry and furnished convincing proof that the manufacturers are constantly striving adequately to supplement the operator in his progress.

Through the courtesy of General Electric Company, L. W. Shugg again served as director of exhibits.



Joint luncheon meeting of the Board of Governors, Western Division, and Board of Directors, American Mining Congress

ENTERTAINMENT

Popularity of the entertainment functions planned by the local committees was plainly reflected by the splendid turnouts of hundreds of delegates and their wives at all four principal events.

Welcoming Luncheon.—More than 400 delegates and convention guests, ladies included, turned out for the Welcoming Luncheon held in the beautiful and spacious Cocoanut Grove of the Ambassador. Robert Linton presided at this luncheon, at which Governor Frank F. Merriam, of California, and S. A. Lindauer, representing Mayor Fletcher Bowron, of Los Angeles, extended a warm welcome to all those attending the meetings. Governor Merriam outlined the importance of minerals in contributing to the wealth and prosperity of California and of the entire United States, and emphasized that tax burdens on the industry must not be increased. He also described in glowing terms the varied climate and scenic attractions of the state, and urged delegates to avail themselves of the opportunity to enjoy as many of these as possible during their stay.

Appropriate responses on behalf of all those present were made by Howard I. Young, president of the American Mining Congress; Stanly A. Easton, chairman of the Western Division, and Thos. H. O'Brien, chairman of the Program Committee.

"Get-Together" Night.—Over 500 delegates and ladies gathered together Monday evening in the main ballroom of the Biltmore Hotel for a delicious dinner, followed by dancing and a splendid floor show of varied entertainment. Space for tables was taxed to the limit, and nothing other than most enthusiastic comment was heard concerning the fine cuisine and amusement features.

"Early California Days."—The quaint Spanish surroundings of Olvera Street formed an appropriate setting for the barbecue at Cafe Caliente on Tuesday evening. Romero, "the barbecue king," of Southern California, served a succulent feast, after which special entertainment comprising troubadors, serenaders, and an original Mexican puppet show, topped by the Caliente floor show, was enjoyed by all. Guests found the many quaint Mexican shops most unusual and colorful, and undoubtedly took back home various samples of Mexican art work.

"Early California Days" at Cafe Caliente on quaint Olvera Street. Large numbers of guests were also seated at tables outside

Concluding the festivities was a brief five-minute broadcast over the coast hook-up of Columbia Broadcasting Company, in which Robert Linton, Julian D. Conover, Albert Knorp, Mrs. Carley and H. B. Howe participated.

Annual Dinner.—Serving as a suitable climax to the convention activities the annual dinner was held on Thursday evening, with the incomparable beauty of Cocoanut Grove as a background. Nearly a thousand guests and ladies heard Toastmaster Harvey S. Mudd introduce Cornelius F. Kelley, president, Anaconda Copper Mining Company, who traced outstanding historical events in the metal mining industry from ancient times to the present, declaring that, "The American mining industry may well look back upon its past with the earned satisfaction of successful accomplishment."

Pointing out the changed conditions which face us today, he concluded by declaring, "We do not believe that the destiny of this great republic has been fulfilled. We do not believe that its institutions have resulted in failure or that the constitutional limitations upon the powers of government or its constitutional agencies should be ignored or brushed aside. On the contrary, we reaffirm our faith in its perpetuity and our unwavering conviction that as it has been in the past—so it shall continue in the future, a land where peace and prosperity shall be established within, and to the world its precepts and example may be a benign influence to lead the nations to the way of peace, tolerance and freedom of thought, action and belief now so flagrantly challenged."

Following Mr. Kelley's address, guests enjoyed to the fullest degree the opportunity of dancing to the rhythmic and soothing tunes of the all-time king of waltz music, Wayne King and his orchestra.

LUNCHEON MEETINGS

On Tuesday noon a luncheon meeting was held for the American Mining Congress Committee for Cooperation with the Securities and Exchange Commission, and on Wednesday noon a luncheon meeting of the Executive Tax Committee was convened, both of which were well attended.

On Thursday noon a joint luncheon meeting of the Board of Governors, Western Division, and the Board of Directors of the American Mining Congress was held, at which the following members of the Board of Governors of the Western Division were elected for the coming year:

Alaska.—Roy Earling, Fairbanks Exploration Company, Fairbanks; P. R. Bradley, Alaska Juneau Mining Co., San Francisco, Calif.

Arizona.—P. G. Beckett, Phelps Dodge Corporation, Douglas; T. H. O'Brien, Inspiration Consolidated Copper Co., Inspiration. Exofficio, M. Curley, Governor, Arizona Chapter, A. M. C., Ajo.

California.—Thomas McCormack, Natomas Dredging Co., Sacramento; Worthen Bradley, president, Bradley Mining Co., San Francisco; Robert Linton, mining engineer, Edison Bldg., Los Angeles.

Colorado.—W. J. Coulter, Western manager, Climax Molybdenum Co., Climax; George H. Rupp, Colorado Fuel & Iron Corp., Pueblo. Exofficio, Robt. S. Palmer, secretary, Colorado Chapter, A. M. C., Denver.

Idaho.—Leo J. Hoban, secretary, Hecla Mining Co., Wallace; A. H. Burroughs, Jr., president, Talache Mines, Inc., Boise. Exofficio, J. W. Gwinn, Idaho Mining Association, Boise.

Montana.—W. B. Daly, Anaconda Copper Mining Co., Butte; J. D. Mackenzie, American Smelting & Refining Co., East Helena. Exofficio, Carl J. Trauerman, Montana Mining Association, Butte.

Nevada.—H. A. Johnson, Tonopah Mining Co., Tonopah; J. C. Kinnear, Nevada Consolidated Copper Corp., McGill. Exofficio, Henry M. Rives, Nevada Mine Operators Association, Reno.

New Mexico.—Horace Moses, general manager, Chino Division, Nevada Cons. Copper Co., Hurley; Ira L. Wright, Black Hawk Consolidated Mines Co., Silver City. Exofficio, J. F. Woodbury, secretary, New Mexico Chapter, A. M. C., Silver City.

Oklahoma.—George W. Potter, Eagle Picher Mining & Smelting Co., Picher; John A. Robinson, Commerce Mining & Royalty Co., Miami. Exofficio, Evan Just, Tri-State Zinc & Lead Ore Producers Association, Miami.

South Dakota.—Guy N. Bjorge, Homestake Mining Co., Lead; C. E. Dawson, Bald Mountain Mining Co., Trojan.

Texas.—Brent N. Rickard, El Paso Smelting Works, American Smelting & Refining Co., El Paso; H. E. Treichler, Texas Gulf Sulphur Co. Newgulf.

Utah—D. D. Moffat, vice president, Utah Copper Co., Salt Lake City; F. S. Mulock, general manager, Western Operations, U. S. Smelting, Refining & Mining Co., Salt Lake City. Exofficio, A. G. Mackenzie, secretary, Utah Chapter, A. M. C., Salt Lake City.

Washington.—L. P. Larsen, Pend Oreille Mines & Metals Co., Old National Bank Bldg., Spokane; C. P. Browning, general manager, Chelan Division, Howe Sound Co., Holden. Exofficio, Roger O. Oscarson, Northwest Mining Association, Spokane.

Election of the new chairman of the Board of Governors was deferred until a slightly later date.

Invitations to hold the 1939 Convention and Exposition were extended by delegates from Colorado Springs, Salt Lake City, San Francisco and Las Vegas, Nev. Decision as to the place and date of this meeting will also be made in the near future.

SPECIAL LADIES ENTERTAINMENT

A fine program of special entertainment for the record number of ladies attending the convention with their husbands centered about tours of the many and varied attractions in the general Los Angeles area. These included: A visit to Columbia Square, world's most modern radio station, on Monday afternoon; a tour by bus through Warner Brothers Studio, followed by a drive past the homes of motion picture celebrities and tea at the home of Mrs. Harvey S. Mudd Tuesday afternoon; a trip to Pasadena, including Rose Bowl, California Institute of Technology, Santa Anita race track, and San Gabriel Mission, with luncheon at Huntington Hotel on Wednesday; and a duplicate tour on Thursday to Columbia Square for those who could not make the trip Monday.

TRIPS

Following the convention's official close on Thursday, a goodly representation of delegates remained to avail themselves of the opportunity to enjoy the splendid excursions program arranged by the local committees. Some 35 boarded a special bus on Friday morning for a trip out to the mills and surface plants of the Golden Queen and Cactus Queen Mines in the Mojave district. On Saturday, separate groups made trips to the following points of interest: The limestone mine of the Riverside Cement Company; the San Jacinto tunnel of the Metropolitan District of Southern California; the mine and mill operations at the Yellow Astor Mine in the Atolia-Randsburg District, and around Los Angeles harbor.

NEWS and VIEWS

Improved Transportation Aids Central Idaho Operations

This has been one of the busiest years in the history of mining in the Elk City and Clearwater districts of central Idaho where gold was discovered in the early 60's. CCC boys have done valuable work in extending highways to remote parts of this region, some of which have waited 75 years for transportation. One of these camps is Summit Flat between the South Fork of the Clearwater River and Crooked River. The North Hill and Una companies, Spokane corporations, are taking advantage of better transportation, and are developing their properties which they have held many years.

Andrew McGregor, of Vancouver, B. C., and associates, now have the Lone Pine mine at Golden, which for 30 years has been one of the heaviest lode gold producers in Idaho. F. O. and Stanley Miller, of Lewiston, Idaho, were owners and operators of this property many years.

Orogrande-Frisco Gold Mines Company on Crooked River is the biggest mining enterprise in this section of Idaho. It is a low-grade property with a 600-ton mill.

Grangeville Gold Company has recently enlarged its mill near Elk City to 50 tons per day. Other lode mining is active in the Ten Mile, Newsome, Dixie, and other camps, and there are signs of renewed activity in the Buffalo Hump country.

Placer mining is still active along many creeks in this district, once famous for its placer gold production, and S. D. Alexander, of Vancouver, B. C., has installed the first dredge ever floated in the South Fork of the Clearwater River.

Southern Wyoming Coal Association Meets

The annual meeting of the Southern Wyoming Coal Operators Association was held recently at the Plains Hotel in Cheyenne, Wyo., with a fine turnout.

Members of the Board of Directors elected were as follows: Glen Eastman, Bear River Coal Co.; W. J. Thompson, Colony Coal Co.; T. C. Russell, Diamond Coal and Coke Co.; T. J. O'Brien, Gunn-Quealy Coal Co.; L. M. Pratt, Kemmerer Coal Co.; Ben Cowlishaw, Lincoln-Star Coal Co.; A. B. Foulger, Lion Coal Corp.; and John Lucas, Rock Springs Fuel Co. Following adjournment of the meeting the directors met in executive session and reelected T. J. O'Brien, president; W. J. Thompson, vice president; and L. W. Mitchell, treasurer and executive secretary for the ensuing year.

West Virginia Safety Meet

Twenty of West Virginia's best mine first-aid teams vied for honors at the State's Safety Meet held in Fairmont on October 8, with the Wevaco squad of the Traux-Traer Coal Company winning first place, and second honors being won by the Marfork team of the same company. In the negro competition, the Grant Town team of the Koppers Coal Company was first, and the team from the Helen Mine of the Koppers Company was second.

Prizes to the winning teams were awarded by N. P. Rhinehart, chief of the State Department of Mines. Approximately 4,000 people witnessed the festivities.

Yuba Plans World's Largest Dredge

Plans for construction of what will be the largest gold dredge in the world were recently announced by an official of the Yuba Consolidated Goldfields.

The largest dredge at the present time is now operating in Yuba County, and digs 112 ft. below the surface of its pond. The new boat will be able to dig to a depth of more than 150 ft., possibly as much as 180 ft. below the surface, to recover gold values in gravel now out of reach.

It is expected that the new boat will be in operation next summer. Engineering work is now under way, and construction work will start at the Yuba Construction Company plant at Benicia in the fall, to be followed by assembly work at Hammonton, Calif.

Miners to Loan Money for Reopening Three Collieries

According to an Associated Press report from Shenandoah, Pa., miners formerly employed at three Packer collieries are going to lend the operator $50,000 to permit resumption of work at the mines. This amount is needed by the Weston Dodson Coal Company for working capital.

According to the proposal, which the miners voted to accept, bankers and business men will lend the money to the company, and each worker will have $5.00 taken from his wages every two weeks to repay the loan. The plan further provides for reimbursement of the workers by the company at the end of two years.

Copper Refineries at Great Falls Resume Operation

Announcement that the copper refineries of the Anaconda Copper Mining Company in the Great Falls, Mont., reduction works would resume immediately was made early in September by Cornelius F. Kelley, president, during an inspection trip of the plant.

The zinc plant has been operating five out of eight units and the wire mill has also been working; the copper furnaces, however, had been cold for a number of weeks, owing to conditions in the copper market. It required more than two weeks to get the furnaces hot once again.

Shattuck-Denn Exploration Continues

Exploration and development of the Shattuck-Denn Mine, where operations were discontinued in July, are going ahead on the 2,300, 2,430 and 2,565-ft. levels, with 225 men on the payroll.

According to the latest report to stockholders, no ore discoveries of importance have been made this year, following the discovery of the new ore body in the lower levels in 1936 and 1937.

Resume Construction of Utah Mill

The International Smelting and Refining Company, Utah subsidiary of the Anaconda Copper Mining Company, recently resumed construction of the 600-ton flotation mill in Ophir Canyon, to treat 400,000 tons of tailings from the old Ophir Hill Consolidated mill.

Construction of the mill was started in 1937, but the slump in the copper market halted the work last spring. It is expected that the mill will be ready for operation late this fall.

Anthracite Producers Purchase Equipment

Improvement in the anthracite coal mining industries is reflected in recent purchases of new equipment by several independent producing concerns in the vicinity of Pittston, Pa.

The Anthracite Coal Company has placed an order with the American Car and Foundry Company for $319,000 worth of steel-bodied mine cars; a contract for 500 steel-bodied cars has been placed with the same concern by the Volpe Coal Company for use in the Pittston area, with the same company planning purchase of $72,000 worth of coal-digging and coal-preparing machinery and equipment; and the Haddock Mining Company has acquired more than $85,000 worth of machinery and equipment for the Tomhicken mine, formerly operated by the Coxe Brothers Company.

Idaho Gold Producer Reopened

Gold Producers Company, of which L. L. McLean, of Spokane, Wash., is manager, has acquired the Greunter mine at Shoup, Idaho, and is moving its 50-ton mill to that property. The mill has been located at the Twin Brothers mine at Gibbonsville, Idaho. The Greunter has an estimated 300,000 tons of gold ore of a milling grade. Concentrates are to be shipped to Salt Lake City, Utah.

Novel Machine for Reclaiming Stored Iron Ore

The machine illustrated above is a Robins-Messiter Reclaiming Machine assembled in the factory before shipment to a blast furnace plant in England. Its purpose is to reclaim ore from a storage pile which has been built up in layers of predetermined proportions of different grades or kinds of ore. Such a storage pile is built up by a moving tripper on an overhead belt conveyor discharging layer after layer of the desired ores until a complete pile or "bed" or triangular cross section is built.

The Reclaimer runs on rails located at the toes of the storage bed and the large triangular "harrow" shown at the right of the picture rests against the sloping end of the triangular-section bed. This harrow carries a large number of spikes projecting into the surface of the ore bed and has a slow movement back and forth across the pile so that the surface is scratched or agitated and the loosened ore from all parts of the surface flows down in a uniform mixture as the reclaimer moves slowly but powerfully forward.

The loosened ore, representing a perfect blend of all the layers in the bed, is conveyed to one side by a scraper conveyor consisting of a series of plows mounted on a heavy chain and supported under the front of the reclaimer frame. At one side of the ore bed a belt conveyor, installed in a trench, carries the reclaimed ore to the furnace skips.

The propelling mechanism for moving the reclaimer into the ore bed is of a slow but variable speed in the control of an operator who has available a higher speed of travel for retreating after a bed is reclaimed. This retreating travel places the reclaimer on a transfer car which moves it to another storage bed.

Similar Reclaimers have been in use for many years at copper smelters in the United States, South America and the Belgian Congo, and they are now finding a wider field in the handling of iron ore.

The builder is the Robins Conveying Belt Company of New York.

Southern Illinois Marketing Agency Applies for Approval

A hearing was held on August 29 in Washington, D. C., before Trial Examiner William A. Cuff of the National Bituminous Coal Commission staff, on the application of Southern Illinois Coals, Inc., for provisional approval as a marketing agency. Total production of the seven coal companies forming the proposed marketing agency amounted to 11,195,000 tons in 1937.

Members of Southern Illinois Coals, Inc., comprise the following: Bell and Zoller Coal and Mining Company; Chicago, Wilmington and Franklin Coal Company; Franklin County Coal Corporation; Old Ben Coal Corporation; Peabody Coal Company; Wasson Coal Company, and the Consolidated Coal Company.

The application was taken under consideration by Examiner Cuff, who will prepare a report with recommendations for consideration by the Commission.

Mine Union Proposal Supported by Inglis

The proposal of the United Mine Workers that the Pennsylvania state legislature create a commission to rehabilitate the anthracite industry was supported by Major W. W. Inglis, president of the Glen Alden Coal Company, in a statement made on August 30.

Major Inglis described the Union's plan as the "sanest of proposals placed before the special session of the legislature," thus joining with District President Michael J. Kosik of the Miners Union and other observers in the industry who have added their endorsement to the plan.

The union proposal is that the legislature establish a commission to study the industry to the end that it will be rehabilitated; provide state aid to develop additional uses and fields for anthracite, and that a thorough inquiry into freight rates on the commodity be made.

"The proposal has merit," Major Inglis said, "if for no other reason than it contemplates first a study of the problems involved rather than a plunge into experimental legislation."

Argonaut Operations Back to Normal Following Fire

Normal milling operations have been resumed at the Argonaut Mine at Jackson, Amador County, Calif., following unwatering of the mine and retimbering made necessary by a fire on the 4,300 foot level in the ventilation system of the Muldoon Shaft that occurred in February. According to Alex Ross, superintendent, 1,200 tons of ore were in the bin when mill operations started. Approximately 250 men were back on the job by the end of July.

Cartel of World Lead Producers to be Formed

According to reports from London early in September, leading world producers of lead have agreed to organize a lead producers association for the purpose of setting up necessary measures to balance production with consumption. Details of the plan have not been worked out, but it is said that its machinery will probably be fashioned along the lines of the copper restriction plan.

The meeting at which these plans were discussed was held the first week in September in London, with representatives present from Australia, Burma, Jugoslavia, the Consolidated Mining and Smelting Company, Ltd., of Canada, and the American Smelting and Refining Company of the United States. It is said that this representation controls some 75 percent of the world output, exclusive of the United States, and constitutes a sufficient nucleus to make the plan workable. Other European producers, with the exception of Germany, will be invited to join the association.

Columbia River Smelters Organize

Columbia River Smelters Company has been organized in Spokane, Wash., and has acquired the Northport Smelter site together with what buildings remain at Northport, Stevens County, Wash. The company proposes to use the Albert Koebel patents and smelter processes being developed by him at The Dalles, Oreg., and in Denver, Colo. Initial expenditure for equipment will run about $30,000. Gold and other ore in northeastern Washington will be handled on a customs basis, and it is said that ample ores are available in that district to supply the plant's initial capacity of 250 tons daily. After a reputed expenditure of about $1,000,000, the Northport Smelting and Refining Company abandoned this enterprise some 20 years ago. Application for disincorporation has been made by the Northport Smelting and Refining Company.

Officers of the new company comprise Fred F. Barnes, president; C. E. Stead, secretary, and Carl F. Schuff, counsel, all of Spokane, Wash. They state that the plant will be in operation this summer.

New Plant for Illinois Strip Mine

The Reconstruction Finance Corporation recently approved a loan of $650,000 to the Midwest Smokeless Fuel Corporation for erection of a tipple, washer and carbonizing plant to be installed at the new strip mine to be opened in the vicinity of Millstadt, Ill. Work on the project will begin at once.

Electrification Completed by Kentucky Producers

The Alta Coal Company, Inc., operating the Summit mine at Summiton, Walker County, Ky., is completing electrification of its operation. A large electric hoist is replacing one formerly in use, additional preparation equipment is being installed, transmission lines are being built to bore holes for the handling of current to power additional coal-cutting machines, locomotives and pumps, and a motor-generator set is being installed.

The ventilation system is also being changed and extended to meet requirements of the larger operating area.

The property is operated by the National Coal and Coke Company, Birmingham, of which R. T. Daniel is president, and Howard J. Thomas, general superintendent of mines.

Ruth Brothers Start Operation in Tri-State

Ruth Bros. and associates have resumed mining operations at the new shaft sunk on their 50-acre tract on the Frank Roth land, located a mile and a half east of Smithfield, Mo. They had made a good strike of zinc ore a few weeks earlier on the same tract.

The mine is being developed on the 120-foot level, preliminary to building of a mill on the site. While sinking the shaft to the 120-foot level, high-grade zinc ore was encountered starting on the 111-foot level.

West Virginia Coal Mine Reopened

Following a shutdown of many years' duration, the old St. Clair mine in the Eagle section near Montgomery, W. Va., will soon resume operation. Work of building tramways around the mountain, making openings and clearing a site for the head house was begun August 29 by the Eagle Collieries, Inc., who have leased the property. The company is headed by A. H. Sopher, and it is said that large expenditures will be made in improvements to modernize the operation. These will include construction of a coal loading conveyor tipple and ice breaker, to be located at the head of Wheelers Island, opposite the Kanawha and Hocking Coal and Coke Company's tipple at Harewood.

Suggested Price Hearings For Appalachian Area in Final Stretch

● *Interstate Commerce Commission Requested to Deny Continuation of Temporary Rate Increases*

PROPOSED price hearings for the Appalachian coal producing area got under way October 10 and the hearings held to date have made one thing apparent—namely, that the Commission is involved in a procedural question which may delay the final setting of minimum prices to well beyond the first of next year.

Under a ruling issued on October 18 by the Commission, producers were informed that if they were ever to have a day in court before final establishment of prices, all protests against intra-district price relationships proposed by the district boards and all evidence pertaining thereto would have to be submitted to the hearings currently in progress. District boards, it is understood, have urged their members to speak now. Prior to this ruling it had been the understanding of producers as well as the Consumers Counsel that the question of protests, cross-examination and evidence would remain open until the hearing was held on final coordination of minimum prices. A statement by Commissioner Maloney during the current hearing charged producers with the duty of having their day in court during the present hearings. This created the obvious feeling on the part of producers that they would not have the right to present fuller information on intra-district differentials at the final hearing. Since the Commission has indicated that where price differentials are changed in coordination, consideration of them would be necessary at the final hearing, it appears that many of the items covered at the current hearing will have to again be covered.

Chairman Tetlow, speaking from the bench during the present hearings, said that the Commission had adopted a procedure for the establishment of minimum prices that would enable it to meet every requirement of law, and that the Commission seeks to protect the rights of every person.

"We have sought and will have all of the information possible so that we can administer this law justly, so that in the end there can be no complaint. It has taken us months to compile this information, which goes far beyond what any other industry has ever had to furnish. We did this so we would have all of the facts, and so that we could proceed justly. When people want to receive the benefits from regulation, nothing can be concealed that is necessary to proper regulation.

"This is a legislative commission with judicial functions, and among those functions is to see that administrative law is fairly administered."

The Appalachian hearings are drawing to a close after some three weeks devoted to hearing from the district boards in minimum price area number 1. Hearing on district board number 8 was prolonged due to protests filed by some forty coal producers against certain coal classifications and other matters in the district's price schedule.

The Commission has annuonced that the last hearing upon proposed price schedules for the country will be that for price area number 2 and will be held at the Morrison Hotel, Chicago, Ill., beginning November 14.

While the Commission is playing an active part in the hearings, it is not the most active factor. Controversies have arisen between operators and their own district boards over coal analyses and classifications. Of greatest significance will be the role of the Commission when the time comes to coordinate prices—when the questions of freight rates and the coordinating of coals in the various price and market areas must be determined. This action follows conclusion of the suggested price hearings and upon its completion announcement of the price schedules will be made.

Final settlement of the question of whether the cost data of individual coal producers may be entered as evidence into the Coal Commission's price hearings and otherwise made generally available for inspection to interested parties with a legitimate interest in seeing them, is awaited. The United States Court of Appeals for the District of Columbia is expected to hand down early in November its decision in the case of the Utah Fuel Company and 21 other companies vs. the Commission. This issue has been contested ever since the early days of the Commission. The case is a test of the ruling of August 31, issued by the Commission, calling for all cost data to be made public to parties having a legitimate interest in seeing it. Producers claimed exposure of costs would cause great damage. The Commission was, however, unconvinced that revelation of 1936 coal cost data would cause damage. The Commission won its point in the District Court for the District of Columbia and like the producers awaits definite decision from the appellate court.

A study by the Division of Economic Research of the National Labor Relations Board on labor conditions in the bituminous coal industry from the time of the World War to the present is attracting considerable attention. It is a statistical study for the most part and carefully outlines the economic importance of the industry and its relation to the stream of interstate commerce.

Freight rates came in for further "blasting" by Consumers Counsel John Carson, on October 26. He urged the Interstate Commerce Commission to deny the railroads' petition for continuation of temporary increases on bituminous coal and advised the carriers to adopt a practice of reducing rather than increasing freight charges.

The increases amounting to 10 cents per ton in the east and 15 cents in the west became effective last November and are to expire December 31, 1938.

Loss of bituminous coal markets to other fuels was attributed in part to freight charges by Donald Gallagher, traffic attorney for the agency.

"The Consumers' Counsel," he said, "wants to be fair, if he thought that the railroads were not getting the cost of service plus a reasonable return on this business we would not be here protesting a continuation of these increases, but we believe that the freight rates for transporting bituminous coal are too high. The average freight rate is far beyond the price of coal itself.

"The whole question in this case is simply this: Will not the continuation of these increases result in a loss of tonnage and actually decrease in revenue for the railroads because coal consumers will shift to other fuels if the increases are continued? In other words, will not the Commission injure rather than help the railroads by allowing a continuation of the increases?

"It seems that the time has come when the Interstate Commerce Com-

mission should say to the railroads with regards to bituminous coal that revenues will not be increased by maintaining high freight rates on this commodity. Here is a commodity that is facing an uphill battle to compete with oil and gas. We believe that commonsense should dictate to the railroads that they should do everything within their power to encourage the use of bituminous coal as a fuel. They can best do this by lowering the freight rates on it but when they seek to raise the transportation charges they are driving consumers to abandon the use of coal and to use oil or gas and are driving revenues away from themselves."

An exhibit presented by Consumers' Counsel in the case, shows that freight rates on bituminous coal have increased more than the rates on other comparable commodities, and that while general commodity prices and the production of bituminous coal have fallen more than twenty per cent in the past twelve years, freight rates have steadily increased.

The National Bituminous Coal Commission also presented a brief to the Interstate Commerce Commission in which it was pointed out that those railroads suffering from acute financial troubles were not benefited by the temporary increases in coal freight rates but rather that railroads who were fairly prosperous and not suffering from acute financial needs were getting the benefit from the increased rates.

West Virginia Institute Meets

Over 200 operating officials assembled at Fairmont, W. Va., October 7 for the thirty-first annual meeting of the West Virginia Coal Mining Institute. Speakers at the sessions held in the morning and afternoon included Carel Robinson, president of the Institute; William Norris, Jr., safety director of the Carter Coal Company; Paul Weir, consulting engineer of Chicago; R. H. Morris, general manager of the Gauley Mountain Coal Company; Neil Robinson, Elkhorn Coal Corporation; C. C. Dickinson, president of the Dickinson Fuel Company; N. P. Rhinehart, chief of the State Department of Mines; and A. G. Matthews, State Workmen's Compensation Commissioner. A banquet wound up festivities on Friday, with D. C. Kennedy, secretary of the Kanawha Coal Operators Association, presenting the principal address.

F. F. Jorgensen, of Fairmont, vice president of the Institute, presided at the afternoon meeting, and was later elected president for the coming year. Other officers of the organization are:

C. W. Connor, of Nellis, first vice president; George Caldwell, of Wellsburg, second vice president; Douglas J. Gorman, of Pocahontas, Va., third vice president; Walter Crichton, of Charleston, fourth vice president; T. E. Johnson, of Fairmont, fifth vice president; and Dr. C. E. Lawall, acting president of the West Virginia University, was reelected secretary-treasurer.

Cresson Acts to Prevent Eye Injuries

An unusual number of eye injuries in mines of the Cripple Creek district during 1938 is causing mine operators to take steps to stop this type of injury. Effective August 15, the Cresson mine put into effect a rule requiring all men, both underground and on the surface, to wear goggles for eye protection.

According to General Superintendent A. H. Bebee, of the Carlton properties, the number of eye injuries at the Cresson (86 during the present year) makes this action necessary, and the requirement will be rigidly enforced.

Iron Mining Resumed in Missouri

Six iron mines recently resumed operations in southern Missouri, and others are being prepared for operation. Output of these mines is consumed at southern blast furnaces, where there has been a pronounced revival in demand for pig iron.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1938.

City of Washington,
District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared B. E. Chambers, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, and business manager are:

Name of publisher, The American Mining Congress, Washington, D. C.

Editor, Richard J. Lund, Washington, D. C.

Business manager, B. E. Chambers, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young. St. Louis, Mo.; Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

B. E. CHAMBERS,
Business Manager.

Sworn to and subscribed before me this 17th day of October, 1938.

[SEAL] ELSIE L. LEISHEAR,
Notary Public.

(My commission expires January 31, 1939.)

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New Shaft Completed in Tri-State

A new 60-foot shaft has been completed on the Rawlinson tract, a mile south of Duenweg, Mo., by Perry Watson and associates. Lead ore was encountered in cutting a door for a drift to be driven south from the bottom of the shaft. Associated with Watson are Arlie Hulen, George Minshall, Perry Barnes, and Joe Dorizzi, all of Joplin.

Resume at Old Washington Operations

The old Silverton mines on the Stillaquamish River near Granite Falls, Wash., have been opened by Messrs. Sloan, Calhoun and associates. A turbine developing a maximum of 400 hp. at 110 volts A.C. will supply power to a completely electrified mill. Primary crushers feed a ball mill and rolls, from which the pulp goes to a selective flotation plant using primary and secondary flotation units and gravity tables. Ore values are principally silver and gold.

West Virginia Department of Mines Rescue Training Station

The centralized mine rescue training station of the West Virginia Department of Mines is situated at the operations of the McKell Coal & Coke Company, Kilsyth, W. Va. The company gave the State Department of Mines permission to use a building on the grounds as a meeting place for classes and an unused mine for actual mine rescue training. Two smoke

chambers have been constructed inside the mine, each having an air-lock entrance. Smoke and fumes are created within the smoke chambers, and the members of the rescue crews undergoing training enter the chambers wearing self-contained oxygen breathing apparatus, and perform a certain amount of manual labor for a period of about two hours. The crew members are also taught methods for detection of the various gases in coal mines, how to properly fight mine fires, mine rescue organization, etc.

The centralized mine rescue training opened at Kilysth, W. Va., on May 2, 1938. Over 250 men have reported for instruction and 125 have received certificates issued by the State Department of Mines. Classes are available each weekday except Saturday. Twenty-four hours are required to complete the training.

BOOK REVIEW

QUARTZ FAMILY MINERALS: A Handbook for the Mineral Collector, *by H. C. Dake, Frank L. Fleener, and Ben Hur Wilson. Whittlesey House (McGraw-Hill Book Company), New York City,* 1938. 304 *pages. Price* $2.50.

RESISTANCE of quartz to surface weathering and underground influences is high, therefore "float" quartz (fragments, boulders, cobbles, pebbles, sand) and the outcrops and sub-surface parts of veins break down very slowly unless some decomposable mineral such as pyrite is present. Quartz, in its many forms, is commonly sought by prospectors and mineral collectors, the former because it is the principal gangue for many marketable minerals, and collectors because of its variety of ornamental and saleable stones and gems.

Four chapters in the book cover the several forms of quartz—crystalline, massive, intermediary, and cryptocrystalline and amorphous. Two chapters on method of formation of quartz crystals and their characteristics precede those on the crystalline forms of quartz.

Considerable attention is devoted to agate, a variegated chalcedony, itself a cryptocrystalline variety of quartz. A section of polished agate forms the frontispiece to the book. The chapter devoted to agate describes and illustrates its occurrence, formation, florescence, and artificial coloring.

Although the book's sub-title terms it "A Handbook for the Mineral Collector", for whom there is an illustrated chapter on the art of cutting gem quartz, the reviewer is of the opinion that it is of considerable value to the prospector and to those engaged in producing the so-called industrial minerals and rocks.

Although the volume weighs 1½ pounds it is not heavy reading; to the contrary, it is intensely interesting and informative, and has an easy style of writing which invites thorough perusal. There is a complete index, together with generous reference to books and papers. The book comprises a handy and reliable reference to collectors, prospectors, engineers and students.— *M. W. von Bernewitz.*

PUBLICATIONS of INTEREST

U. S. BUREAU OF MINES

T. P. 582. METHODS FOR THE DETECTION AND DETERMINATION OF CARBON MONOXIDE, by L. B. Berger and H. H. Schrenk. 30 pp. 8 figs. 10 cents.

T. P. 585. FLOTATION FOR RECOVERY OF SCHEELITE FROM SLIMED MATERIAL, by E. S. Leaver and M. B. Royer. 24 pp. 1 fig. 10 cents.

R. I. 3407. EARTH VIBRATIONS CAUSED BY MINE BLASTING. Progress Report 2, by J. R. Thoenen and Stephen L. Windes. 40 pp. 45 figs.

R. I. 3409. BALL-MILL GRINDABILITY INDEXES OF SOME AMERICAN COALS, by H. F. Yancey and M. R. Geer. 9 pp. 2 figs.

I. C. 7025. SOME OBSERVATIONS ON THE CAUSES, BEHAVIOR, AND CONTROL OF FIRES IN STEEP-PITCH ANTHRACITE MINES, by G. E. McElroy. 36 pp.

I. C. 7032. SOME OBSERVATIONS ON COAL-MINE FANS AND COAL-MINE VENTILATION, by D. Harrington and E. H. Denny.

U. S. GEOLOGICAL SURVEY

Bull. 893. METALLIFEROUS MINERAL DEPOSITS OF THE CASCADE RANGE IN OREGON, by Eugene Callaghan and A. F. Buddington. (Prepared in cooperation with the State Mining Board of Oregon.) 141 pp. 22 plates. 7 figs. $1.25.

Water Supply Paper 820. DROUGHT OF 1936 WITH DISCUSSION ON THE SIGNIFICANCE OF DROUGHT IN RELATION TO CLIMATE. by John C. Hoyt. 62 pp. 2 plates. 18 figs. 15 cents.

MISCELLANEOUS

CALIFORNIA JOURNAL OF MINES AND GEOLOGY, quarterly chapter of State Mineralogist's Report XXXIV, April, 1938. Walter W. Bradley, State Mineralogist. Contains a detailed report on gold dredging in Shasta, Siskiyou and Trinity Counties, by Charles Volney Averill, Mining Engineer; and a report on the geology of the central Santa Monica Mountains, of Los Angeles County, by E. K. Soper, Associate Professor of Geology at the University of California at Los Angeles. 110 pp.

PROCEEDINGS OF THE TWENTY - THIRD FUEL ENGINEERING CONFERENCE. Sponsored by Fuel Engineering Division of Appalachian Coals, Inc.

BITUMINOUS COAL TABLES, 1936-1937. National Bituminous Coal Commission, Division of Research and Statistics, F. G. Tryon, Director. 72 pp.

15

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PERSONALS

GEORGE O. TARLETON, superintendent of the Consolidation Coal Company Pinnickinnick mine in Clarksburg during the past four years, has been transferred to Fairmont and is now assistant general manager for the company's West Virginia division. He replaces GEORGE HIGGINBOTHAM, formerly of Shinnston, who was transferred to the department of safety and efficiency. Tarleton's position at the Pinnickinnick mine will be filled by O. F. ALLEN, who has been at the company's mine at Carolina in Marion County, W. Va.

Tarleton has been with the Consolidation Coal Company for the past 20 years, and has been at the Pinnickinnick mine for the last eight years, four of them as superintendent of the operation.

Y. D. HILLS

YALE D. HILLS has been made manager of distributor sales for the Service-Sales Division of the Timken Roller Bearing Company, with headquarters at the main Timken factory in Canton, Ohio.

For several years Mr. Hills has been manager of the Los Angeles territory branch of the company. In developing plans for the highly successful Metal Mining Convention and Exposition of the American Mining Congress just held in Los Angeles, he rendered very valuable assistance as Chairman of the Exhibits Committee.

STANLY A. KNISELY, advertising manager of the Republic Steel Corporation, was elected president of the National Industrial Advertisers Association at the organization's sixteenth annual convention held in Cleveland, Ohio, September 21-23.

Mr. Knisely, with a background of newspaper editorial work, association management and advertising experience, has gained national prominence in the advertising field through his work and his wide contacts.

He succeeds F. O. WYSE, of the Bucyrus-Erie Company, who has been president during the past year.

T. J. FEAR has been appointed general manager of the Elk Horn Coal Corporation. Mr. Fear has had a wide experience in bituminous coal mining both in the northern and southern Appalachian fields.

A. F. HARPER has been appointed superintendent of the Mulga coal mining division of the Woodward Iron Company, at Mulga, Jefferson County, Ala.

JAMES J. DOWNING, safety director of the Sloss-Sheffield Steel and Iron Company, was elected president of the Safety Engineer's Club of Alabama at its annual meeting September 7. J. L. SHORES, Alabama Power Company, was elected vice president; and HUBERT E. MILLS, of the Alabama Mining Institute, was renamed secretary-treasurer.

P. R. BRADLEY, president of the Alaska Juneau Gold Mining Company, recently arrived at Juneau, Alaska, on his annual visit to the company's property. He reported that no new development is being planned by the company, but that they are carrying on development work all the time and expect to maintain operations at about the normal rate.

—Obituaries—

R. H. T. ADAMS, JR., secretary-treasurer of the Lynchburg Coal and Coke Company and the Eureka Coal and Coke Company and a director of the Raleigh Coal and Coke Company, died in Lynchburg, Va., August 28. Mr. Adams' death came as a result of a stroke suffered three days previously while he was away on a fishing trip. He was 67 years old.

JOSEPH H. FRANTZ, vice chairman of the board of the American Rolling Mill Company and widely known and highly respected throughout the American iron and steel industry, died August 19 at his home in Columbus, Ohio, after several years of poor health. His age was 74.

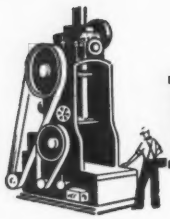
FRANK NICHOLSON, former well known mining operator in the Joplin district, Missouri, died in Geneva, Switzerland, August 18. His age was 75. Mr. Nicholson went to the Tri-State District in 1898, and for 10 or 12 years was identified with major operations in the mining field.

LEWIS A. TOMPKINS, vice president and comptroller of the Lehigh Valley Coal Company, died suddenly of heart disease in Wilkes-Barre, Pa., September 22. His age was 73. He had been with the Lehigh Company for 35 years, starting as an auditor.

ROY A. RAINEY, chairman of the board of W. J. Rainey, Inc., New York City, died during the hurricane that spread over New England on September 21. He was at his summer home at Watch Hill, R. I., one of the points hardest hit by the wind and tidal wave, and was killed when his house was demolished.

In addition to Mr. Rainey's large interests in W. J. Rainey, Inc., operating extensive coal and coke properties in western Pennsylvania for many years, he had other wide connections that in recent years prevented him from participating actively in affairs of the coal industry.

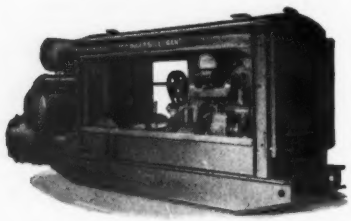
LEMUEL P. SHATTUCK, president of the Shattuck-Denn Mining Corporation, Bisbee, Ariz., and pioneer Arizona mining man since 1905, died at Bisbee, September 7, at the age of 72.



MANUFACTURERS' Forum

Heavy Duty Portable Compressor

A new compressor delivering 425 cu. ft. of air per minute (actual) at 100 lb. has been announced by Ingersoll-Rand. Known as the Model 425, it is a self-contained compressor plant, available in portable or semiportable mountings. Employing the same slow-speed, heavy-duty, stationary-type compressor usually purchased for a permanent installation, it is unique in



the economy of its operation and the durability of its construction.

A four-cylinder, heavy-duty tractor-type engine drives the compressor through simple reduction gears. Either gasoline, gas, or oil engines can be furnished.

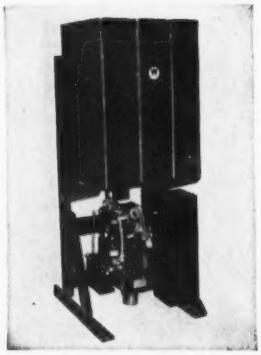
The unit is compact and light, and is ideally suited for contracting and oil-field service.

Copies of descriptive Bulletin 2486 may be obtained from Ingersoll-Rand, 11 Broadway, New York City, or any of their branch offices.

Indoor Circuit Breakers

New indoor circuit breakers for both central station and industrial plant use are now available in ratings up to 15,000 volts. Known as the Westinghouse Type U De-ion air circuit breakers, these 2,500 and 5,000 volt breakers now complete a line of medium capacity indoor breakers with interrupting capacity ratings from 75,000 to 500,000 kv.-a. for 25 or 60 cycles or other commercial frequencies.

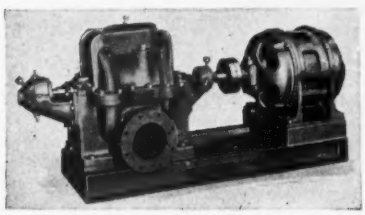
Type U De-ion air circuit breakers operate entirely without oil or liquid, function in normal atmosphere and are not dependent upon the maintenance of any medium such as air pressure or a vacuum. High-speed arc control, arc-resisting contacts, solenoid operation, universal mounting arrangements, improved mechanical construction assure low operating costs.



Low maintenance costs and inherent characteristics of the breakers have led to their use in highly repetitive services approaching contactor duty, such as reversing breakers for steel-mill motors and primary breakers for steel-mill motors and primary breakers for arc furnaces on voltages of 6,600 and 13,800.

Improved Hotwell and Condensate Pump

In recent literature directed to steam power plant owners and operators, Worthington Pump and Machinery Corporation, of Harrison, N. J., announced the development of an im-



proved two-stage centrifugal hotwell and condensate pump. Featuring oversized suction openings, pick-up type impellers, and generous vents, the new line of pumps is offered for efficient removal of condensate under high vacuum, with minimum available submergence.

The casing of the new pump is of cast iron, horizontally split for ready access and removal of the rotor. Suction and discharge nozzles are located in the lower half of the casing, while an interstage passage is cast integral with the upper half of the casing. A liberal-sized vent is provided to permit escape of entrained vapor.

Other important details of construction, dimension tables, and an interesting sectional view of this improved product are contained in the Worthington Bulletin W-318-B15.

Single Groove Adjustable Sheave

The Texrope division, Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has developed something new in an adjustable Texsteel sheave,

truly a combination sheave for double duty. This sheave has a range of pitch diameter varying from 2 to 3 in., and from 3 to 4 in. by merely removing the adjustable plate, reversing and again placing on the hub.

As shown in the picture, the outer plate in the position shown at left allows the Texrope belts to ride high and give a pitch diameter anywhere from 3 to 4 in.; the outer plate reversed in the position shown at the

right allows the Texrope belts to ride low and give a pitch diameter anywhere from 2 to 3 in.; the two together providing for a speed variation of 100 percent. This change takes but a moment.

This sheave has been developed in response to a demand for a sheave that is low in cost and yet has a wide range of speed variation. It is especially well suited to the heating and ventilating industry.

FRANK D. NEWBURY

Newbury Heads Westinghouse Division

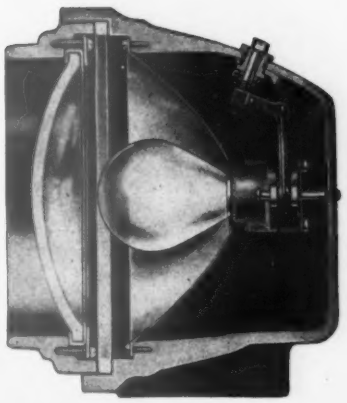
Mr. Frank D. Newbury has been appointed manager of the New Products Division of the Westinghouse Electric & Manufacturing Company. Mr. George H. Bucher, president of the company, announced his appointment as successor to Herbert Mygatt Wilcox, who died July 28.

In addition to development of activities for Westinghouse in new fields, Mr. Newbury will continue his present duties as economist for the company.

Focusing Mechanisms For Headlights

The Ohio Brass Company, Mansfield, Ohio, announces new incandescent mine headlight developments facilitating accurate focus adjustment.

The Type MB headlight for gathering locomotives is now available with externally-operated focusing mechanism with medium screw base, push-pull focusing mechanism with medium screw base, and medium pre-focus base. The Type MSS headlight for main haulage is also available with these three focusing arrangements.



The Type MS headlight and the new Type MF explosion-proof headlight are furnished with push-pull and pre-focus designs. The externally-operated focusing mechanism eliminates opening the casing in any way for adjusting the beam. All headlights are now furnished with the new corrosion-resistant Alzak reflector. This superior reflector will not chip, crack or peel and is easily cleaned.

A new type of rugged heavy-duty porcelain-tube resistance has been designed to meet current requirements for these headlights.

A new line of modern diesel engines for heavy-duty continuous service in sizes of 300 to 800 hp. is announced by Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. Above is an eight-cylinder 800-hp. RHB-100 CP diesel incorporating new improvements of this line

CATALOGS and BULLETINS

• CABLE SPLICERS, BINDERS AND TERMINALS, *American Mine Door Co.*, Canton, Ohio. Pamphlet, "CANTON" CABLE SPLICERS, BINDERS AND TERMINALS, illustrates and describes company's complete line of this equipment. 8 pages.

• HEADLIGHTS, *The Ohio Brass Co.*, Mansfield, Ohio. Booklet 655-MD describes developments in new incandescent mine headlights, including information on new resistance designs, focusing mechanisms, and introducing a new permissible explosion-proof headlight and its accompanying gas-proof resistance. 16 pages.

• HOISTS, *American Hoist and Derrick Co.*, St. Paul, Minn. Bulletin 100-H-1 presents uses, load and speed ratings, and general specifications of the company's gasoline, Diesel, and electric-powered general purpose hoists. 24 pages.

Catalog 100-H-2 presents the complete line of American gasoline, Diesel, and electric hoists. 16 pages.

• MATERIALS HANDLING EQUIPMENT, *American Hoist & Derrick Co.*, St. Paul, Minn. Bulletin SNP. 3 presents advantages and specifications of the American heavy-duty snow plows and wings. 8 pages.

Bulletin SNP. 4 describes American snow plows of the mouldboard types, including both conical and reversible. 4 pages.

Bulletin 700-G-11 describes in detail construction of the American Gopher 1½-, 1¾- and 2-yd. heavy-duty shovels, draglines, and clamshell cranes. 8 pages.

Catalog 600-L-2 gives construction details and applications of the company's 40- and 50-ton locomotive cranes. 20 pages.

R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Calif. Form 224 comprises LeTourneau's new improved grade and haul calculator for 12-yd. carryalls—a scientific, accurately engineered, and carefully prepared slide-rule for easy computation of all vital earth-moving data. Copies may be had by writing the company at either of the offices listed above.

Bucyrus-Erie Co., South Milwaukee, Wis. Bulletin MP-W-9 announces the new Bucyrus-Monighan 3-W walking dragline and describes the many advantageous features of this new machine, a companion to the well-known 5-W machine. 16 pages.

• ROCK DUSTING EQUIPMENT, *American Mine Door Co.*, Canton, Ohio. Form 106 outlines advantages of rock dusting mines, and presents specifications and performances of the company's complete line of Dustributors. Does not include data on company's new Mighty Midget Dustributor, specifications of which are enclosed on separate card. 16 pages.

• SAFETY SHOES, *Lehigh Safety Shoe Co., Inc.*, Allentown, Pa. Handbook entitled STOP FOOT INJURIES is a convincing little booklet describing the construction of Lehigh safety shoes, listing a variety of case histories of feet saved by the use of the shoes, and presenting a complete description of the company's full line of shoes and boots. 32 pages.

• SECTIONALIZED TURNOUTS, *The West Virginia Rail Co.*, Huntington, W. Va. Circular 214 announces the company's new sectionalized turnout, a new aid to mechanized mining that may be laid, dismantled or moved in a small fraction of the time required for standard turnouts. Built in four compact units, it may be easily handled by two men. Sections of the turnout are fastened together with standard track bolts, with no other loose parts included. Splice bars are riveted alternately to the section ends, making a rigid joint quickly assembled. 2 pages.

• SWITCHES, *The Trumbull Electric Mfg. Co.*, Plainville, Conn. Circular 301-838-20-M presents the features of construction and operation of the company's Fuse-Puller Switches. 4 pages.

• TRACTORS, *Caterpillar Tractor Co.*, Peoria, Ill. Form 4757 presents operating costs and specifications of the 25-hp. "Caterpillar" Diesel D-2 Tractor. Many fine action pictures are included. 32 pages.

• WATER GAGES, *Ernst Water Column & Gage Co.*, P. O. Box 734, Livingston, N. J. Bulletin 734 presents applications and specifications of the Ernst "Split-Gland" adjustable water gages. 4 pages.

SECTIONALIZE with

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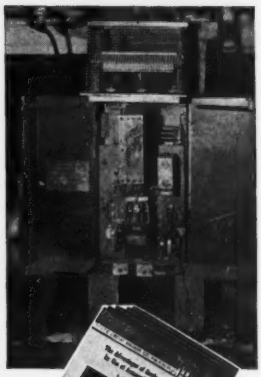
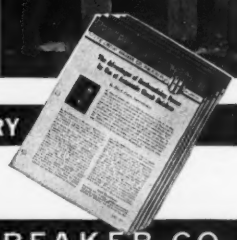


At right—Each circuit breaker controls a section, confining disturbances to the area in which they arise.

Representatives in Principal Mining Areas



BULLETINS TELL THE STORY

These bulletins deal with a variety of mining conditions. Copies will be gladly furnished on request.

I-T-E CIRCUIT BREAKER CO.
PHILADELPHIA, PA.

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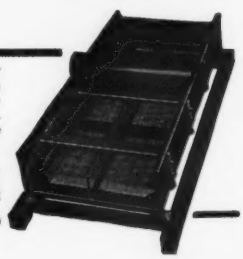

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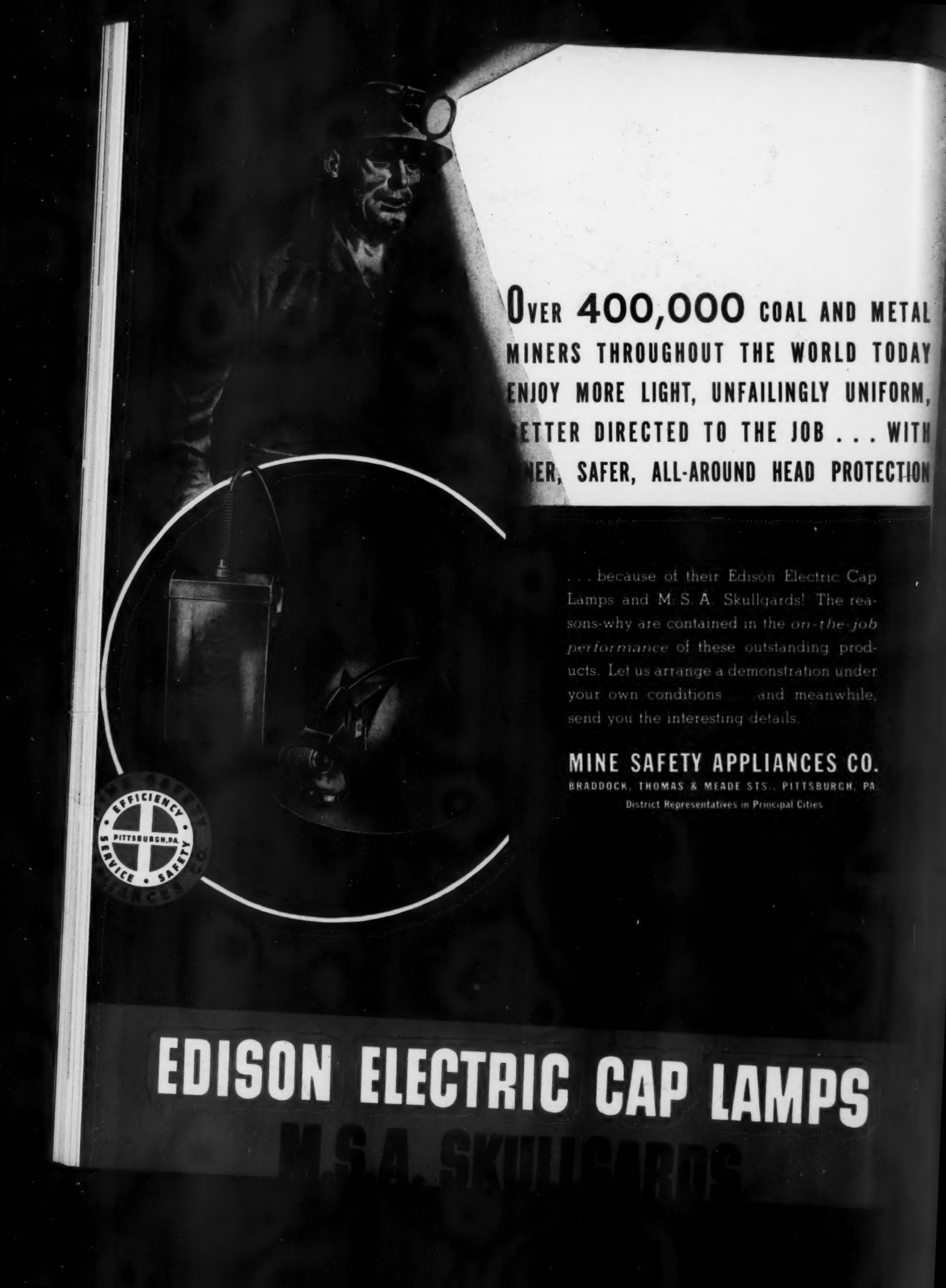
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